

Appendix G

Task Name	Plan Start	Plan Finish	Base Start	Base Finish
Phase II Document Preparation				
Remedial Design Phase II (RD-II) Work Plan	Fri 09/29/00	Tue 01/08/02	Thu 04/12/01	Thu 08/08/02
Prepare Draft RD-II Work Plan	Fri 09/29/00	Wed 05/02/01	Thu 04/12/01	Mon 11/12/01
Issue Draft RD-II Work Plan	Fri 09/29/00	Wed 02/28/01	Thu 04/12/01	Sun 09/03/01
EPA/IDEQ Review	Thu 03/01/01	Mon 04/02/01	Mon 09/10/01	Mon 08/10/01
Respond to EPA/IDEQ Comments	Fri 03/02/01	Mon 04/02/01	Tue 09/11/01	Thu 10/11/01
Remedial Design Report/Remedial Action Phase II (RD/RA-II) Work Plan	Tue 04/03/01	Wed 05/02/01	Fri 10/12/01	Mon 11/12/01
Prepare Draft RD/RA-II Work Plan	Tue 04/03/01	Tue 01/08/02	Fri 10/12/01	Thu 08/08/02
Issue Draft RD/RA-II Work Plan	Thu 09/06/01	Thu 08/08/02	Fri 10/12/01	Mon 04/08/02
EPA/IDEQ Review	Fri 09/07/01	Mon 10/22/01	Mon 04/08/02	Mon 04/08/02
Incorporate EPA/IDEQ Comments	Tue 10/23/01	Thu 12/06/01	Tue 04/09/02	Thu 05/23/02
Issue Draft Final RD/RA-II Work Plan	Fri 12/07/01	Fri 12/07/01	Fri 05/24/02	Sun 07/07/02
Resolve Comments on Draft Final RD/RA-II Work Plan	Sun 12/08/01	Mon 01/07/02	Tue 07/09/02	Wed 08/07/02
Issue Final RD/RA-II Work Plan	Tue 01/08/02	Tue 01/08/02	Thu 08/08/02	Thu 08/08/02
Complete Phase I Remedial Actions				
Perform Phase II Tasks	Thu 07/01/99	Thu 07/51/03	Thu 07/01/99	Thu 07/31/03
Collect Borehole Data (Permeability Testing)	Tue 07/01/03	Mon 10/03/05	Fri 10/01/04	Tue 10/10/06
Engineered Cover Construction	Fri 08/01/03	Tue 09/30/03	Mon 08/02/04	Thu 09/30/04
Prepare Technical Specification (Includes Local Approval)	Tue 07/01/03	Fri 10/15/04	Thu 07/01/04	Wed 10/12/05
Submit to EPA/IDEQ for Concurrence	Wed 12/31/03	Wed 12/31/03	Fri 12/31/04	Fri 12/31/04
Obtain EPA/IDEQ Concurrence	Thu 01/01/04	Tue 03/02/04	Mon 01/03/05	Wed 03/02/05
Purchasing Actions	Wed 03/03/04	Sun 04/02/04	Thu 03/03/05	Fri 04/29/05
Award Contract	Mon 05/03/04	Mon 05/03/04	Mon 05/02/05	Mon 05/02/05
Contractor Mobilization	Tue 05/04/04	Tue 05/18/04	Mon 05/02/05	Mon 05/16/05
Complete Cover Construction	Wed 05/19/04	Fri 10/15/04	Tue 05/17/05	Wed 10/12/05
Preliminary Inspection	Fri 10/15/04	Fri 04/01/05	Thu 10/13/05	Mon 04/03/06
Perform Preliminary Inspection	Fri 10/15/04	Fri 10/15/04	Thu 10/13/05	Thu 10/13/05
Prepare Draft Preliminary Inspection Report	Sat 10/16/04	Wed 12/15/04	Fri 10/14/05	Tue 12/13/05
Issue Draft Preliminary Inspection Report	Thu 12/16/04	Thu 12/16/04	Wed 12/14/05	Wed 12/14/05
EPA/IDEQ Review	Fri 12/17/04	Mon 01/17/05	Thu 12/15/05	Fri 01/13/06
Respond to EPA/IDEQ Comments	Tue 01/18/05	Wed 02/16/05	Mon 01/16/06	Wed 02/15/06
Final Inspection	Fri 04/01/05	Fri 04/01/05	Mon 04/03/06	Mon 04/03/06
RA Report	Tue 01/04/05	Mon 10/03/05	Wed 01/04/06	Fri 10/06/06
Prepare RA Report	Tue 01/04/05	Tue 05/03/05	Wed 01/04/06	Thu 06/01/06
Issue Draft RA Report	Wed 06/01/05	Wed 06/01/05	Fri 06/02/06	Fri 06/02/06
EPA/IDEQ Review	Thu 06/02/05	Mon 07/18/05	Mon 06/05/06	Thu 07/20/06
Incorporate EPA/IDEQ Comments	Tue 07/19/05	Thu 08/01/05	Fri 07/21/06	Tue 08/05/06
Issue Draft Final RA Report	Fri 08/02/05	Fri 08/02/05	Wed 08/06/06	Wed 08/06/06
Resolve Comments on Draft Final RA Report	Sat 08/03/05	Sun 10/02/05	Thu 09/07/06	Thu 10/05/06
Issue Final RA Report	Mon 10/03/05	Mon 10/03/05	Fri 10/06/06	Fri 10/06/06

Appendix H

RD/RA-II Site Specific Health and Safety Plan

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1.0 INTRODUCTION

This section of the Operable Unit (OU) 8-08 Site Specific Health and Safety Plan (HASP) document defines applicability and responsibilities with respect to compliance with Health and Safety programs for industrial safety and chemically hazardous aspects of the remediation work. Existing Naval Reactors (NR) Program radiological controls will be followed for this work, in accordance with Naval Reactors Facility (NRF) local site procedures and consistent with controls used during prior remedial investigation site sampling work and Phase I Remedial Actions. Report NT-99-3 describes these controls.

1.1 Scope and Applicability of the Site Health and Safety Plan

The purpose of this site specific HASP is to define the requirements and designate protocols to be followed during the Phase II Remedial Action work activities performed at the designated OU 8-08 sites located at NRF. Applicability extends to all NRF employees, Department of Energy-Idaho Branch Office (DOE-IBO) personnel, subcontractor personnel, and visitors. The subcontractor shall submit a supplemental HASP that addresses the issues as described herein and will provide the organizational structure of key personnel.

All personnel on site shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation. This site specific HASP summarizes those hazards and defines protective measures planned for the designated OU 8-08 sites to minimize health and safety risks to personnel working at these sites.

This plan must be reviewed and an agreement to comply with the requirements must be made by all personnel prior to entering the exclusion zone or contamination reduction zone. In addition, NRF and each subcontractor will provide protective equipment to their respective personnel.

During development of this plan, consideration was given to current safety standards as defined by: 1) The Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the National Institutes of Safety and Health (NIOSH), 2) health effects and standards for known contaminants, and 3) procedures designed to account for the potential of exposure to unknown substances. Specifically, the following reference sources have been consulted:

EPA

- 40 CFR 311
- U.S. EPA, Office of Emergency and Remedial Response (OERR) Environmental Response Team (ERT) Standard Operating Safety Guides (1988)

OSHA and NIOSH

- OSHA 29 Code of Federal Regulations (CFR) 1910.120
- NIOSH Pocket Guide to Chemical Hazards (latest edition)

- Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Government Industrial Hygienists (ACGIH) Cincinnati, OH.
- OSHA/NIOSH/EPA/United States Coast Guard (USCG) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985)

DOE

- DOE Order 440.1A, Worker Protection Management for DOE Federal and Contractor Employees

NRF

- NRF Health and Safety
- NRF Emergency Plan
- NRF Lifting and Handling Manual
- Local radiological controls reference documents
- NRF Environmental Control Manuals

1.2 Visitors

All visitors entering the contamination reduction zone and exclusion zone at the site will be required to read and verify compliance with the provisions of this site specific HASP. In addition, visitors will be expected to comply with relevant OSHA requirements such as medical monitoring, training, and respiratory protection.

In the event that a visitor does not adhere to the provisions of this site specific HASP, he/she will be required to leave the work area. All nonconformance events will be recorded in the site log.

2.0 KEY PERSONNEL/ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

To properly administer the HASP requirements, the identification and assignment of responsibilities to key individuals is essential for the development, coordination and implementation of the plan. The organizational structure should identify these individuals and establish the chain of command to effectively implement the plan through an integrated effort.

2.1 Key Personnel

The key personnel that are critical to the planned OU 8-08 Phase II Remedial Action activities at the designated OU 8-08 sites are listed in the sections below. Job tasks are also discussed in these sections. The subcontractor personnel will be identified when the subcontractor submits a supplemental HASP.

2.2 Site Specific Health and Safety Personnel

Health and Safety Officer (HSO) – Since the HSO is responsible for health and safety issues for all of the workers on-site, the HSO has the responsibility for ensuring the adequacy and proper implementation of the HASP on all the field work activities being conducted. Therefore, the HSO must be completely familiar with the provisions of the site specific HASP. The HSO also has the responsibility to advise the Project Engineer (PE) on health and safety aspects concerning site operations. The HSO shall also conduct periodic site inspections to evaluate the effectiveness of the HASP. The HSO shall review and modify the HASP when unforeseen hazardous conditions are encountered that are not adequately addressed in the HASP. The HSO holds periodic site safety meetings to address any safety-related concerns at the site. The HSO will also confirm that on-site personnel have the proper medical surveillance program and appropriate training. Additionally, the HSO shall ensure that the site monitoring equipment is properly maintained and calibrated. The HSO will make sure that the appropriate type of Personal Protection Equipment (PPE) is being utilized and in good condition. Rick Spielman will be the Bechtel HSO and can be reached at 533-5846.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, personnel assigned as HSO will be experienced and will meet the additional training requirements specified by OSHA in 29 CFR 1910.120 (see Section 4.0 of this HASP).

The subcontractor will designate the site HSO for the planned OU 8-08 Phase II Remedial Action activities who will work together with NRF site representatives.

Industrial Hygienist (IH): The NRF IH (certified by the American Board of Industrial Hygiene in Comprehensive Practice) is the primary source of information regarding hazardous and toxic agents at the OU 8-08 sites. The IH serves in a consulting capacity for assessing the potential for worker exposures to hazardous agents, recommending appropriate hazard controls for the protection of work site personnel, and reviewing the effectiveness of monitoring and PPE. The hazard assessments are performed in accordance with the NRF Health and Safety Manual. The Bechtel IH duties will be shared between Rick Spielman (533-5846) and Bill Hammond (533-5826).

Safety Engineer (SE): The NRF safety engineer also serves in a consulting capacity. The safety engineer will be consulted in the review of OU 8-08 site work documents, observation of site work activities, in assessing compliance with the NRF Health and Safety Manual. The safety engineer

recommends solutions to industrial safety issues that arise. The Bechtel SE will be Rich Spielman. He can be reached at 533-5846.

Radiological Controls Engineer (RCE): The NRF Radiological Controls engineer also serves in a consulting capacity regarding radiological issues. The NRF Radiological Controls engineer is the primary source of information and guidance relative to the evaluation and control of radioactive hazards at the NRF OU 8-08 sites. Bob Bergeman will assume the duties of RCE. He may be reached at 533-5394.

2.3 Work Site Personnel

NRF Site Representative:

In general, the NRF site representative is responsible for overall project administration and contractor oversight. As a part of that oversight function, NRF will ensure that project plans, at a minimum, meet DOE requirements and that the health and safety of all site personnel is a primary concern. The NRF site representatives are identified below.

NRF Representatives:

A. Sierra
NRF Environmental Remediation (533-5024)

M. E. Hutchison
NRF Environmental Remediation (533-5509)

K. D. Willie
NRF Environmental Remediation (533-5513)

C. A. Mickelsen
NRF Site Remediation (533-5673)

R. J. Metzger
NRF Site Remediation (533-5118)

C. O. Chynoweth
NRF Site Construction (533-5046)

Task Site Personnel:

All task site personnel are responsible for the execution of OU 8-08 Phase II Remedial Action activities under NRF oversight. The task site personnel will consist primarily of subcontractor personnel. The organizational structure for the site subcontractor will include the position of HSO and/or designated representative. All task site personnel are responsible for understanding and complying with the requirements of the HASP. Task site personnel should identify potentially unsafe situations or conditions to their supervisor or the site HSO for corrective action.

3.0 SITE OPERATION SAFETY AND HEALTH RISK ANALYSIS

3.1 Historical Overview of Site

This site specific HASP defines the hazards and methods to protect personnel from those hazards as identified in previous site work or background information. For a thorough overview of historical information concerning OU 8-08 refer to the OU 8-08 Phase II Work Plan.

3.2 General Site Description

The locations of the four sites of concern associated with the Phase II Remedial Action are depicted in the main text of the Phase II Remedial Design Report/Remedial Action (RD/RA) Work Plan. These sites are identified below and are discussed in more detail in the main text of the RD/RA-II Work Plan.

S1W Leaching Pit (NRF-12B) – This site consists of an inactive leaching pit. This pit was used for the disposal of radioactive effluent that may have contained small amounts of chemicals.

S1W Leaching Beds (NRF-14) – This site consists of two former open ponds or beds that were used for radioactive discharges. Small amounts of chemicals and oil may have also been released in these discharges. This site was also used for the consolidation of radiologically contaminated soil from other OU 8-08 sites remediated under the Phase I RD/RA Work Plan. The primary remedial actions associated with this site are the consolidation of soil in the beds and the construction of an engineered cover over the area.

A1W Leaching Bed (NRF-19) – This site consists of an underground leaching bed that was used for radioactive discharges. Small amounts of chemicals and oil may have also been released in these discharges.

Old Sewage Basin (NRF-21A) – This site consists of a former open pond used for non-radiological discharges that was cross-contaminated with a radiological system. The pond has been filled in with soil. Asbestos containing material has been found in a small area within the preliminary soil cover that is currently over the extended portion of the basin.

3.3 Hazard Evaluation

The evaluation of hazards is based upon the knowledge of site background presented in Section 3.1, and anticipated risks posed by the specific tasks.

The various remedial action work activities that will take place on and around the identified OU 8-08 sites include: soil sampling, surface preparation for the placement of an engineered cover, construction of an engineered cover at each site, and the installation of shallow subsurface monitoring probes.

Most of these activities will entail the use of heavy equipment (e.g., motor grader, compaction equipment, drilling equipment, etc.). Details of these activities are included in the RD/RA-II Work Plan.

The site surface preparation task is the only site activity where the potential exists for chemical

contaminant exposure hazards. Table 3.1 provides a summary of the chemical contaminant exposure hazards for this task at the designated Site. Radiological exposure hazards may also exist during the surface preparation task. Existing NR Program radiological controls will be followed for this work as stated in Section 3.6. Other potential hazards associated with all other work activities and the appropriate control measures are identified in Attachment A.

3.4 Exposure Signs and Symptoms

The acute and chronic exposures to the chemicals that may be encountered during remedial action work activities are detailed below.

Asbestos

There are no acute symptoms from asbestos exposure. Symptoms from asbestos exposure would be caused from chronic exposure. Engineering controls are used and monitoring is performed to ensure workers are not exposed to hazardous levels.

3.5 General Safe Work Practices

The general safe work practices listed below are to be followed while performing work activities at the work site:

1. No initial work activity will commence without reviewing the work document (e.g., technical specification or technical work document) and the HASP, or when any questions arise regarding the HASP requirements.
2. On-site safety meetings will be held periodically and when new personnel arrive that are unfamiliar with the work document or the HASP, or when any hazardous situation arises not adequately addressed by the HASP.
3. Minimize dust emissions.
4. Absolutely no eating, drinking, chewing gum or tobacco, smoking, applying cosmetics or any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials in the designated zone(s). Practice proper hygiene habits (i.e., cleaning up prior to eating and after working at the site using an appropriate cleaning solution).

Parameters for Chemical Contaminants of Concern								
Contaminant	TLV-TWA	PEL-TWA	PEL-CEILING	Action	Site	Known Concentration mg/kg	Contaminant Media	Hazard Summary
Asbestos	0.1 f/cc	0.1 f/cc	1.0 f/cc over 30 minutes	0.1 f/cc	NRF-21A	NA	Asbestos Debris in soil	Low – Moderate

Notes: NA- Not Available,

5. Prevent releases of hazardous materials during remediation activities. If a spill occurs, follow spill control procedures (Section 10.9).
6. Be alert for and heed all information and warning signs at all times.
7. Avoid direct contact with potentially contaminated substances. Do not walk through spills or other areas of contamination. Avoid leaning on or sitting on equipment or ground that may be contaminated.
8. Be alert to potentially hazardous situations that may arise (i.e., strong irritating odors, visible vapor clouds, note any unusual conditions and suspicious substances - stability of stacked items, condition of site structures and equipment being used, etc.).
9. Practice good housekeeping habits (i.e., keep traffic and work areas free from debris or obstacles. Dispose of all trash properly, keep hand tools properly stored when not in use, keep supplies (such as pipe) properly stacked and/or stored. Patrol the area prior to the end of the workday and attend to areas that may have been overlooked to assure a clear and proper work area for the next workday).
10. Misuse of tools and equipment or circumventing safety devices can result in injury to you and/or others. Do not use makeshift tools or equipment to perform your job. Keep all machinery guards, guardrails and other protective devices in place and in good operating order. Use only properly functioning tools and equipment.
11. Promptly report all occupational injuries/illnesses, unsafe and unhealthy practices and conditions to the immediate supervisor.
12. Avoid splashing and overspray during decontamination.
13. Follow 29 CFR 1910.1200 labeling requirements to reduce potential for chemical exposures to chemicals used on-site as cleaning agents or other purposes.
14. Follow appropriate fire protection requirements and fire prevention practices such as:
 - Fire extinguishers must be visible and readily accessible. Debris or any other material must not be on or in front of extinguisher.
 - Ensure fire extinguishers are being inspected monthly and documented on inspection tag.
 - Smoking is strictly prohibited on site except in those areas designated by the HSO.
 - Uses of flammable and combustible liquids must be strictly controlled per NFPA and OSHA requirements.
 - Combustible and flammable material must be minimized
 - Combustible or flammable materials must not be placed next to permanent structures.
 - Labels that identify the container contents are required on

- all containers. The labels should also provide information such as flammable, combustible, toxic, etc.
 - Trash containers with solvent soiled rags should be emptied daily.
15. Be familiar with the contaminants associated with the sites being remediated and physical conditions at the site during remediation activities (i.e., wind direction, areas of known or suspected contamination, warning devices and alarms, accessibility of fellow workers and equipment/vehicles).
 16. When working in the exclusion zone, work in teams according to the buddy system as referenced in Section 8.1 of this document.
 17. Proceed directly to a survey station upon leaving a radiological contamination zone. Care should be taken not to touch the face, mouth, and eyes before a survey has been performed.

3.6 Radiological Controls

Existing NR Program radiological controls will be followed for this work, in accordance with NRF local site procedures and consistent with controls used during prior remedial investigation site sampling work and Phase I Remedial Actions. Report NT-99-3 describes these controls.

4.0 PERSONNEL TRAINING REQUIREMENTS

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all site personnel are required to be trained in accordance with the standard. At a minimum, all personnel are required to be trained to recognize the hazards on-site, become familiar with the provisions of this site specific HASP, and recognize the personnel responsible for site safety and health.

4.1 Preassignment Site Worker Training and Emergency Response Training

Prior to arrival on-site, each employer will be responsible for certifying that his/her employees meet the requirements of preassignment training. Consistent with OSHA 29 CFR 1910.120 paragraph (e)(3), each employee should be able to provide a document certifying dates of 24 hours of training for workers occasionally on-site for a specific task, or 40 hours of training for general site workers. Personnel must receive 8 hours of annual refresher training in order to retain these qualifications. Entry into the Contaminant Reduction Zone (CRZ) requires minimum of 24 hours of HAZWOPER training.

Onsite management and supervisors, (e.g. Project Team Leaders who are responsible for directing others) should receive the same training as the general site workers for whom they are responsible, as well as additional training to enhance their ability to provide guidance and make informed decisions. This additional training should include Management of hazardous waste site cleanup operations and Management of the site work zones.

All visitors to the site (including Idaho Branch Office representatives, regulatory officials, plus any other off-site visitor) must receive a briefing on safety precautions relevant to the site in question before visiting. Visitors may not enter the exclusion zone unless they have received training comparable to the general site workers above, have been fit-tested, and medically approved for respirator use. All other visitors will not enter the Exclusion Zone; rather, they will observe site conditions from the clean area.

The Idaho National Engineering and Environmental Laboratory Hazardous Material (INEEL HAZMAT) Team will be available to respond to site emergencies that involve such incidents as hazardous material spills. This Emergency Response Team has been trained in accordance with requirements of 29 CFR 1910.120 for emergency response.

Other applicable training on NRF safety and emergency response procedures will be covered in the pre-entry meeting.

4.2 Site Supervisors Training

Consistent with OSHA 29 CFR 1910.120 paragraph (e)(4), individuals designated as site supervisors require an additional 8 hours of training.

4.3 Hazard Communication Training

Additional training for site personnel will include hazard communication training requirements in accordance with 29 CFR 1910.1200. The labeling requirements and other forms of warning detailed in this regulation will be met. In accordance with this regulation, Material Safety Data Sheets (MSDS) for all hazardous chemicals used during the site work activities will be readily accessible.

4.4 Training and Briefing Topics

The following items will be discussed by a qualified individual at the site pre-entry briefing(s), as well as at daily or periodic site briefings (i.e., prior to the commencement of or change in a site task).

- Site safety plan
- Physical and chemical properties and hazards
- Emergency and self-rescue procedures (Contingency Plan)
- Good work and housekeeping practices
- Site control measures
- Use and care of PPE
- Instructions for equipment and vehicle use
- Decontamination of personnel and equipment
- Engineering controls
- Applicable health and safety regulations
- Medical monitoring, first aid, stress recognition
- Employee rights and responsibilities

Workers who may be exposed to unique hazards or who may occasionally supervise others should receive additional training in areas such as industrial hygiene, environmental monitoring, hazard evaluation, etc.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED

This section describes the general requirements of the EPA designated Levels of Protection (A - D) and the specific levels of protection required for each task at the Site. These levels should not be confused with the levels of control established for radiological work discussed in Section 5.6.

5.1 Levels of Protection

Personnel wear protective equipment when site activities involve known or suspected atmospheric contamination, when vapors, gases, or particulates may be generated by site activities, or when direct contact with skin-affecting substances may occur. Full-face respirators protect lungs, gastrointestinal tract, and eyes against airborne toxicants. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals.

The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

- | | |
|----------|--|
| Level A: | Should be worn when the highest level of respiratory, skin, and eye protection is needed. |
| Level B: | Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. |
| Level C: | Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed. |
| Level D: | Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards. |

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. For example, Level C respiratory protection and Level D skin protection may be required for a given task. Likewise the type of chemical protective ensemble (i.e., material, format) will depend upon contaminants and degrees of contact.

The Level of Protection selected is based upon the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.
- Potential for exposure to substances in air, splashes of liquids, or other direct contact with material due to work being done.
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be better identified.

5.2 Specific Levels of Protection Planned for the Site

The projected level of protection that will be utilized during field work activities at the OU 8-08 sites is level D with the potential of upgrading to level C.

Level C

PPE for work activities with potential concentrations of contaminants at or above airborne exposure limits or where the potential for dermal absorption exists:

- NIOSH approved respiratory protection equipment.
- Hooded chemical resistant clothing made of materials resistant to the chemicals encountered. This clothing may include: overalls and long sleeved jackets; coveralls; one- or two-piece chemical splash suit; and, disposable chemical resistant overalls.
- Gloves (outer), chemical-resistant (>8 hour breakthrough with respect to mercury and solvent exposure)
- Gloves (inner), chemical-resistant (as above requirement)
- Boots, steel toe (leather above the ankle) chemical-resistant (as above requirement)
- Boot covers, chemical-resistant (as above requirement)
- Hard hat
- 2-way radio communications

Level D

PPE for work activities with concentrations of contaminants below airborne exposure limits, no generation of visible dust and no potential exists for dermal absorption:

- Outer garments/Coveralls
- Inner gloves (optional)
- Outer gloves
- Boots, steel toe (leather above the ankle)
- Boot covers, chemical resistant (optional)
- Hard hat (optional)

5.3 Chemical Resistant Protective Material

The following specific clothing materials are recommended for the site:

Field Work Activities - (Level D & Potential Level C)

- Inner Gloves: Cotton/surgical
- Boots/Boot Covers: Steel toe and chemical resistant
- Outer Gloves: Work gloves: for work with no potential for exposure to

contaminants at or above exposure limits and no potential for skin absorption of mercury exists

Chemical resistant gloves: for work with the potential for exposure to contaminants at or above exposure limits or potential for dermal absorption exists

- Outer Garment/
Coveralls:

Cotton for work with no potential for exposure to contaminants at or above exposure limits and no potential for dermal absorption exists,

Chemical resistant suit: for work with potential exposure to contaminants at or above exposure limit or where potential for dermal absorption exists

5.4 Reassessment of Protection Program

The level of protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or the findings of investigations. An anticipated potential change in site conditions for the tasks at the OU 8-08 sites is dependent on the concentration of contaminants detected and the generation of visible dust which will result in a change of the protection level of PPE required. Should other significant changes occur, the hazards will be reassessed.

5.5 Job Duration

Before the workers actually begin work in their PPE ensembles, the anticipated duration of the job should be established. Several factors limit job duration, including:

- Suit/Ensemble permeation and penetration rates for chemicals.
- Ambient temperature and weather conditions (heat and cold stress, Attachment B).
- Capacity of personnel to work in PPE.

5.6 General Requirements for Radiological Work

The Work Plan text gives radiological control levels and the limits established for each control level. These levels have been identified as Levels 1-5. The PPE requirements for the radiological work required by site procedures are at least as restrictive as the EPA designated levels of protection.

6.0 MEDICAL SURVEILLANCE REQUIREMENTS

Medical monitoring programs are designed to track the physical condition of employees on a regular basis as well as survey baseline or preassignment conditions prior to potential exposures. The medical surveillance program is a part of each employer's Health and Safety program. This program shall be designed and implemented in accordance with 29 CFR 1910.120 and 1910.134 or other requirements that may be applicable under pertinent OSHA standards.

6.1 Baseline or Preassignment Monitoring

Prior to being assigned to a hazardous or a potentially hazardous activity involving exposure to toxic materials, each employee must receive a preassignment or baseline physical. The content of the physical is to be determined by the employer's medical consultant. The minimum medical monitoring requirements are those recommended by the OSHA/ NIOSH/ EPA/USCG's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities.

Employees should be categorized as fit-for-duty and able to wear respiratory protection.

6.2 Periodic Monitoring

All personnel that will be working in potentially contaminated areas will require baseline and periodic physical examinations in accordance with OSHA medical monitoring requirements. The contractor will provide a copy of the examinations to Bechtel-Bettis. The contractor's medical consultant will determine the frequency of periodic physical examinations not required by OSHA. NRF also reserves the right to conduct personnel or area monitoring during performance period.

6.3 Site Specific Medical Monitoring

Specific medical monitoring will be required for personnel who will wear respirators, work in confined spaces, work with extremely hazardous substances, or as designated by the contractor's medical consultant.

6.4 Exposure/Injury/Medical Support

If an injury or illness occurs at NRF, personnel shall report to NRF Medical in Butler Building (BB) 19 on dayshift, or NRF Security in the Gatehouse on backshifts, weekends, or holidays. After treatment, the event will be promptly reported to Bechtel-Bettis personnel and a Record of Occupational Injury or Illness will be completed by the contractor and submitted to NRF Safety.

In the event of a possible exposure to hazardous or toxic substances, contractor personnel should report to their supervisor, who will contact NRF Safety Engineering personnel (located on the first floor of the Central Training building). Depending on the type of exposure, it may be critical to perform follow-up testing within 24 - 48 hours. Safety Engineering will specify what monitoring will be required, and the contractor's medical consultant will perform the testing. Bechtel-Bettis Safety Engineering may also monitor the contractor's employees.

6.5 Exit Physical

At termination of employment or reassignment to an activity or location which does not represent a risk of exposure to hazardous materials related to the original assignment, an employee shall require an exit physical. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of exit exam.

6.6 Radiation Exposure Monitoring

Radiation exposure monitoring will be provided for personnel who will work in areas of radiological concern or handle radioactive material to keep individual exposures "As Low As Reasonably Achievable".

7.0 FREQUENCY AND TYPES OF PERSONAL AIR MONITORING/SAMPLING

This section explains the general concepts of an air-monitoring program and specifies the surveillance activities that will take place during project completion at the site. The purpose of air monitoring is to identify and quantify airborne contaminants in order to verify and determine the level of worker protection needed.

7.1 Industrial Hygiene Air Monitoring and Sampling

The OSHA/NIOSH/EPA/USCG Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities provides an overview of available monitoring/sampling instrumentation and their specific application for on-site use. For the specific instrument to be used, calibration of the instrument is to be performed in accordance with the instrument's calibration procedures.

The generation of dust will be minimized. This may be accomplished by wetting the surface or ground if it is not incompatible with other conditions. Air sampling for chemical contaminants will be performed, if necessary, as directed by the health and safety officer or qualified representative. If dust generation cannot be avoided, air sampling for contaminants must be done to determine if a hazard exists at sites with the potential of generating contaminated dust. The specific equipment for air monitoring/sampling, if required, will be tailored for the specific job, and may include calibrated air sampling pumps or other equipment as appropriate.

If required, air monitoring/sampling will be performed in accordance with the NRF Health and Safety Manual.

7.1.1 Instrument Calibration

All instruments that will be used for air monitoring and sampling will be calibrated each day prior to use. The manufacturer's manual for the specific instrument used shall be consulted for correct use and calibration.

7.2 Radiological Air Monitoring and Sampling

Air monitoring and sampling for radiological contaminants will be performed in areas of radiological concerns in accordance with local NRF radiological control requirements.

8.0 SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program.

8.1 Buddy System

During all activities that present a risk to personnel, the implementation of a buddy system is mandatory. A buddy system requires at least two people to work as a team; each looking out for the other usually staying in close proximity.

8.2 Site Communications Plan

Successful communications between field teams and contact with personnel in the support zone is essential. The following communications systems will be available during activities at the Site.

- Two way radio
- Cell phones
- Hand Signals

<u>Signal</u>	<u>Definition</u>
Hands on top of head	Need assistance
Thumbs up	OK/I am alright/I understand
Thumbs down	No/negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

8.3 Site Preparation

Prior to initiating work, preparations should be made to facilitate access and egress from the area, and to ensure area designations and controls will be workable.

- Arrange traffic flow patterns to ensure efficient operations and minimize the spread of contamination;
- Eliminate as many physical hazards from the work area as practical, including ignition sources in flammable hazard areas, electrical wiring, sharp or protruding objects, debris, slippery surfaces, etc.;
- Provide access for heavy equipment and material transport;
- Provide adequate illumination for work activities.

8.4 Hazardous Waste Work Zone Definitions and Practices

The three general work zones that are typically established at the site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone. Due to the low levels of contamination and other hazards anticipated at the site, the work zones will be kept at a minimum and controlled accordingly. The work zones will be established by the Bechtel-Bettis representative and the subcontractor HSO prior to the commencement of site activities. Figure 8.1 provides a schematic representation of general work zones.

The Exclusion Zone is defined as the area where contamination is either known or likely to be present, or will provide a potential to cause harm to personnel due to activity in the area. Entry into the Exclusion Zone requires the use of PPE.

The Contamination Reduction Zone is the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities to be conducted in this zone will require personal protection as defined in the decontamination plan. This work zone may be excluded for Level D work activities.

The Support Zone is situated in clean areas where the chance to encounter hazardous materials or conditions is minimal. PPE is therefore not required.

Work zones should be posted and controlled in accordance with 29 CFR 1910.120.

8.4.1 Personnel Accountability

Work site security measures will be established to prevent the exposure of unauthorized or unprotected personnel to site hazards, and minimize interference with work in progress. A record of personnel who enter the area will be maintained, and no applicable stay times will be exceeded.

8.4.2 Safe Work Practices

Standing orders for the Exclusion Zone and the Contamination Reduction Zone are detailed below.

The Exclusion Zone Hotline will be posted with these words "Exclusion Zone" and a list of PPE required for entry. Standing orders for the Exclusion Zone are outlined below:

1. No smoking, eating, or drinking.
2. No horse play.
3. No matches or lighters in this zone.
4. Check-in on entrance to this zone.
5. Check-out on exit from this zone.
6. Communications systems in effect.
7. Personnel must be within the line of sight.
8. Appropriate level of protection.

The Contamination Reduction Zone boundary will be posted with these words "Contamination Reduction Zone" and a list of PPE and any other requirements for entry. Standing orders for the Contamination Reduction Zone are outlined below.

1. No smoking, eating, or drinking.
2. No horse play.
3. No matches or lighters in this zone.
4. Wear the appropriate level of protection.

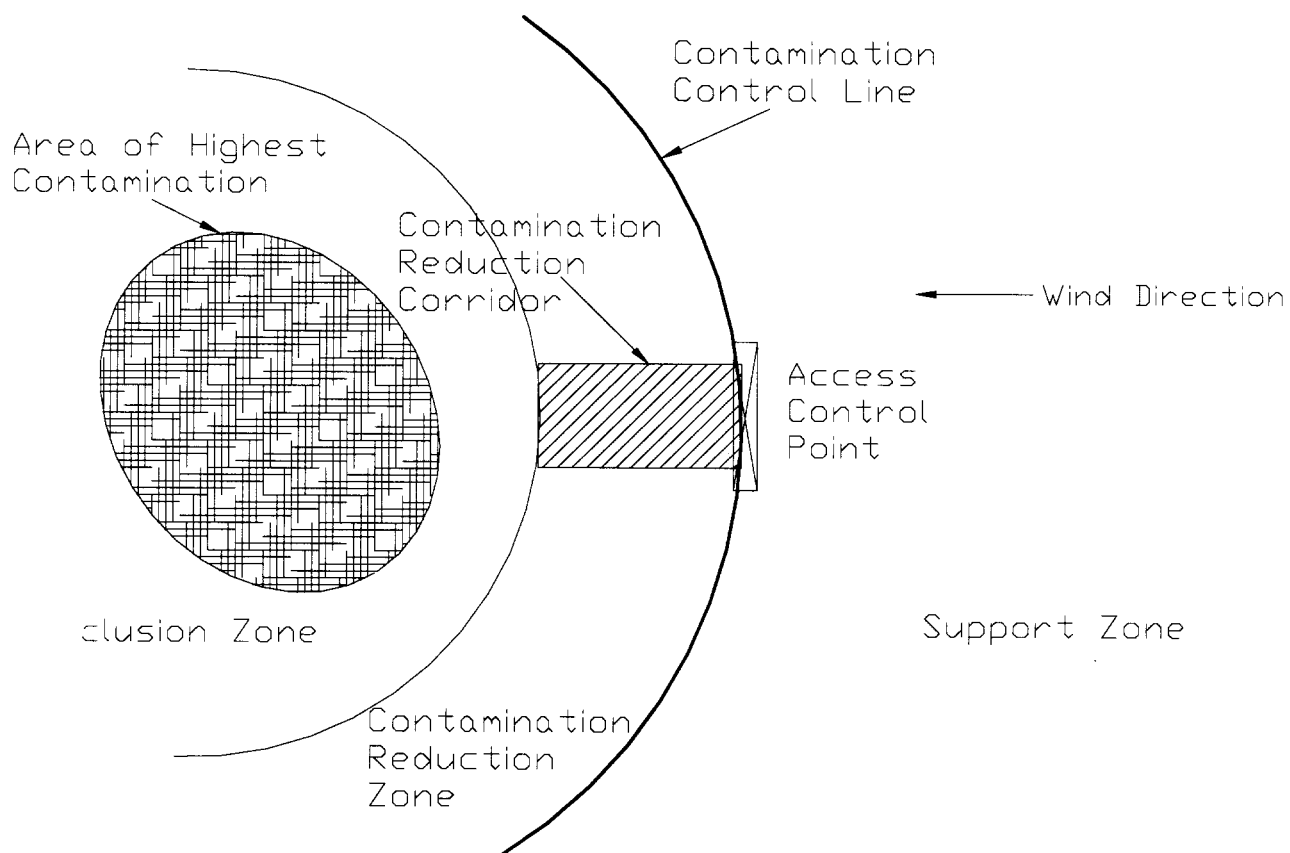


Figure 8.1 Site Work Zones

9.0 DECONTAMINATION PLAN

9.1 Hazardous Waste

Consistent with the levels of protection specified in Section 5.0, the personnel decontamination process associated with these levels is discussed below. These procedures should be modified to suit site conditions and protective ensembles in use.

9.1.1 Operating Procedures

Waste minimization procedures should be utilized to minimize contact and cross contamination of materials. This includes:

- Use of remote sampling and handling techniques;
- Protection of monitoring and sampling equipment by bagging;
- Use of good work habits;
- Wearing disposable outer garments;
- Using disposable equipment when practical;
- Containing the source of contamination.

Decontamination involves the orderly, controlled removal of contaminants. All site personnel should minimize contact with contaminants in order to minimize the need for extensive decontamination. Standard decontamination procedures and measures are discussed below:

General Procedures

- A decontamination area will be established at the Exclusion Zone boundary (Hotline) in the area where personnel exit. When entering the decontamination area from the exclusion zone, personnel will generally doff overboots or chemical resistant boots, coveralls, and outer gloves.
- These articles should then be placed in the appropriate receptacle for recycling or disposal.
- Personnel should be familiar with proper decontamination techniques (i.e., removing PPE clothing in an inside out manner).
- Before exiting the regulated work area, personnel must have removed and properly disposed of all protective clothing and gear, and washed their hands and faces with soap and water (the practice of proper hygiene habits).

9.1.2 Level D Decontamination Measures

- Station 1: Equipment Drop

Deposit equipment used on-site in a designated area on plastic drop cloths to facilitate collection.

- Station 2: Boot Covers/Gloves/Coveralls

Remove boot covers, gloves, and coveralls and place in the proper container (plastic lined).

9.1.3 Level C Decontamination Measures

When Level C PPE is required, the decontamination station should be located at the junction between the exclusion zone and the contamination reduction zone.

Within the exclusion zone just before entry into the contamination reduction zone:

- Station 1: Equipment Drop

Deposit equipment used on-site on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather, a cool down station may be set up in this area.

- Station 2: Decontamination and Tape Removal

Decontaminate outer boots, outer gloves, remove tape around boots and gloves and deposit in plastic-lined containers.

- Stations 3, 4: Outer Boot and Glove Removal

Remove outer boots/boot covers and outer gloves. Deposit in plastic-lined container.

At the Point of Entry into the contamination reduction zone from the exclusion zone:

- Stations 5, 6: Boots/Outer Clothing

If the worker is returning to the exclusion zone, new outer gloves and boot covers are donned, and joints taped. If the worker has finished working, he proceeds to the next station. Remove boots, chemical-resistant suit, and deposit in the appropriate plastic-lined containers.

- Stations 7, 8: Inner Gloves/Clothing

Inner gloves and perspiration-soaked clothing are removed and deposited in the appropriate plastic-lined containers.

At the point of exit/entry from the contamination reduction support zone:

- Station 9: Don Coveralls

Don disposable coveralls.

In locker room or change area:

- Station 10: Remove Coveralls

Remove coveralls and place in appropriate plastic-lined container.

- Station 11: Redress

Put on clean clothes.

9.1.4 Levels of Decontamination Protection Required for Personnel

The level of protection required for personnel assisting with decontamination will be Level D. Modifications include the use of chemical resistant suits, boots and gloves.

The HSO is responsible for monitoring decontamination procedures and determining their effectiveness.

9.1.5 Equipment Decontamination

Sampling equipment will be decontaminated in accordance with procedures described in the Work Plan. Examples of the methods for decontamination of other equipment and heavy machinery may include:

- Pressurized steam cleaning
- Scrubbing and scraping with a brush and scraper
- Triple rinsing

9.1.6 Disposition of Decontamination Wastes

All disposable protective clothing and plastic sheeting used during site operations shall be containerized, labeled, and disposed of per the Waste Management Plan.

9.2 Radiological Waste

Specific radiological operating, decontamination, protection, and disposal procedures will be in accordance with the NRF radiological procedures and the Waste Management Plan.

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

This section describes contingencies and emergency planning procedures to be implemented at the site. The local reference document is the NRF Emergency Plan. This HASP is compatible with local, State and Federal disaster and emergency management plans as appropriate.

10.1 Pre-Emergency Planning

During periodic site briefings, all employees will be trained in and reminded of the provisions of the emergency response plan, communication systems, and evacuation routes. The plan will be reviewed and revised, if necessary, by the HSO. This will ensure that the plan is adequate and consistent with prevailing site conditions. In addition, subcontractor personnel will be briefed on NRF site-wide emergency response procedures during the site pre-work meeting.

10.2 Personnel Roles and Lines of Authority

The Site Supervisor has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measures to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site or adjacent areas. He/she is also responsible for ensuring that corrective measures have been implemented, appropriate notifications made, and follow-up reports completed. The HSO may act on the behalf of the site supervisor, and will direct responses to any medical emergency. The individual subcontractor organizations are responsible for assisting the site supervisor within the parameters of their scope of work.

10.3 Emergency Recognition/Prevention

Section 3.3 details the potential chemical hazard on-site. Additional hazards as a direct result of site activities are listed in Table 10.1 with prevention and control techniques/mechanisms. Personnel will be familiar with techniques of hazard recognition from pre-work training and site-specific briefings. The HSO is responsible for ensuring that prevention devices and equipment are available to personnel.

10.4 Evacuation Routes/Procedures

In the event of an emergency at the site, communications will be established between the site supervisor or HSO and Bechtel-Bettis security/emergency planning via two-way radio. Bechtel-Bettis personnel will be briefed of the emergency situation. They will then contact the appropriate emergency response party. Bechtel-Bettis Medical personnel are on-site during normal working hours (0645 - 1610), and Security will be available to respond to medical emergencies during backshifts, weekends, and holidays. Bechtel-Bettis will subsequently notify the DOE-IBO of the emergency situation.

Table 10-1 Emergency Signals and Responses		
Hazard	Signal	Personnel Action
Fire	A series of three digit coded gongs followed by a PA announcement. Codes are provided in the NRF telephone directory.	Personnel in the immediate area fight the fire, if practicable. Personnel in the affected building go to relocation center.
Take Cover Alarm (Conditions exist that could potentially present a health risk)	Continuous thirty second blast on air raid siren.	All non-emergency response personnel who are out of doors enter the nearest building, and remain inside until the hazard is over. Close all doors and windows and do not eat, drink, or smoke.
Criticality Alarm (Conditions exist that could potentially present a health risk)	Five second, high-pitched pulsating beep and prerecorded message.	Personnel in the immediate area evacuate using an outside route.
Evacuation Signal (Conditions exist that could potentially present a health risk)	Short, five to ten second blasts on air raid siren.	All non-emergency personnel proceed to the parking lot south of NRF.

10.5 Emergency Contact/Notification System

The following list provides names and telephone numbers of the personnel to be notified in the event of an emergency. In the event of a fire, medical or other emergency, the ranking of priorities will be people, plant, and environment. This includes activation of the area fire alarm (if applicable), preventing personnel injuries and loss of human life, minimizing the effects of radiological emergencies, and minimizing property loss. Subcontractor personnel will take direction from the HSO and/or the Bechtel-Bettis area supervisor or on-scene commander.

<u>Organization</u>	<u>Contact</u>	<u>Telephone</u>
Environmental Remediation	M. E. Hutchison A. Sierra K.D. Willie	3-5509 3-5024 3-5513
Industrial Hygiene and Safety	C. R. Spielman W. M. Hammond	3-5846 3-5826
Medical		3-LIFE
Radiological Controls		3-5514, 3-5497
Security		3-5233, 3-5234

10.6 Nearest Medical Assistance

The NRF Dispensary in Butler Building (BB) 19 is available to treat individuals who may experience an illness or injury on-site during regular working hours Monday through Friday. Figure 10.1 illustrates the location of this medical facility. In addition, NRF Security and fire fighting personnel have current certification in CPR and/or first aid. Another medical facility within close proximity is the Central Facilities Area (CFA) dispensary. This facility can provide full medical service during regular working hours Monday through Friday. CFA ambulance service is also available to transport victims to the medical facilities. These facilities should be familiar to all site personnel. A two-way radio will be located at the site at all times to alert NRF Security of any medical emergencies. Security will then contact the appropriate response party.

10.7 Emergency Medical Treatment Procedures

If a person becomes ill or injured in the exclusion zone, first aid shall be promptly administered. NRF Security and/or Medical shall be contacted as soon as practical via two-way radio communications (an N-NET system radio), or using a cell phone to call 3-LIFE (3-5433). NRF Security will promptly contact NRF medical personnel (if not already contacted) and/or the appropriate INEEL emergency medical response parties (i.e., ambulance service, nearest medical facilities). If efforts to contact local emergency personnel fail, INEEL emergency response personnel may be contacted directly by dialing 777. For serious illnesses or injuries, decontamination will not be necessary due to the low levels of contamination anticipated. All work activities near the victim will immediately cease in order that these activities will not interfere with emergency response actions. All injuries and illnesses must immediately be reported to the site supervisor.

Any person being transported to a clinic or hospital for treatment should take information on the chemical(s) they may have been exposed to at the site. This information is included in Attachment A.

10.8 Fire or Explosion Procedures

In the event of a fire or explosion, NRF Security shall be contacted immediately and they will notify the INEEL fire department. Upon arrival of the INEEL fire department at the NRF site, the site supervisor or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on-site.

If it is safe to do so, site personnel may:

- Use fire fighting equipment available on-site to control or extinguish the fire;
- Remove or isolate flammable or other hazardous materials that may contribute to the fire.

10.9 Spills or Leaks

In the event of a spill or a leak, site personnel will:

- Inform their supervisor immediately;

- Locate the source of the spillage and stop the flow if it can be done safely;
- Begin containment and recovery of the spilled materials

10.10 Emergency Equipment

The following emergency equipment will be available on-site:

- First aid kit
- Site two-way radio
- Eye wash stations
- Fire extinguishers

11.0 HEALTH AND SAFETY AUDITS

Compliance with the OU 8-08 HASP and adequacy of the health and safety provisions detailed in the HASP will be determined through a Health and Safety Audit Plan. This audit will be conducted bimonthly by the HSO in accordance with the provisions of the EPA's Health and Safety Audit Guideline manual ("Health and Safety Audit Guidelines, SARA Title I Section 126").

A report of the audits conducted will be made to NRF and subcontractor Project Managers. The subcontractor Project Manager and the HSO will assure that any deficiencies encountered are corrected. NRF personnel will also conduct additional audits during the OU 8-08 site work activities that will include a review of the previous Health and Safety Audits.

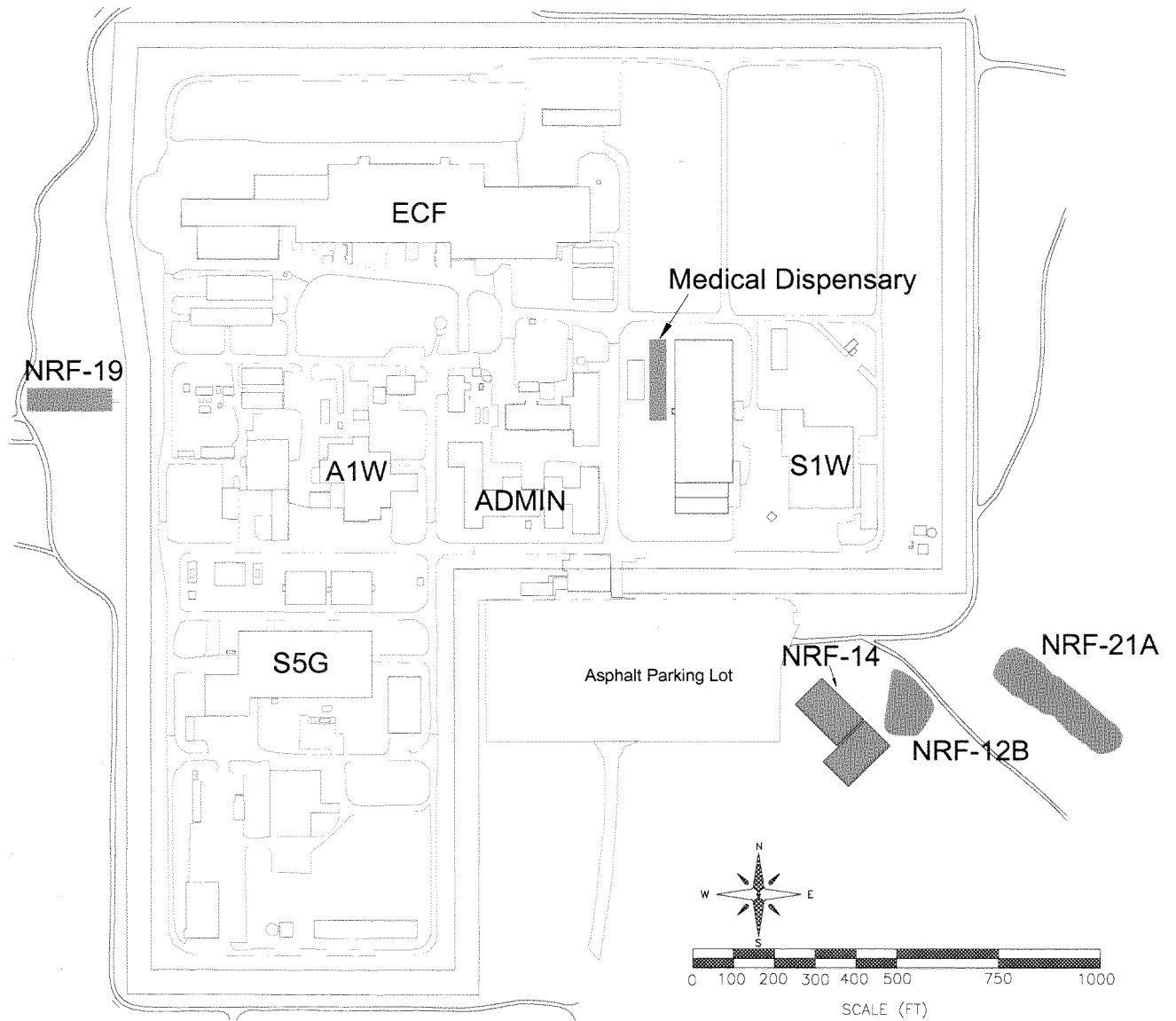


Figure 10.1 Medical Emergency Location

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ATTACHMENT 1

GENERAL SAFETY CONCERNS

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General Safety Concerns and Hazards

The following table provides a general description of potential safety hazards, which may be encountered during the work described by the Work Plan.

Table A-1 General Safety Concerns	
Hazard	General Control Measures
Slipping, tripping and falling	Be alert and cautious while walking in uneven terrain. Use footwear that provides adequate traction and minimizes ankle injuries. Keep the area free of tripping/slipping hazards
Back strain or injuries	Utilize proper lifting techniques. Do not lift over 50 pounds without assistance.
Injuries and disabling conditions as a result of severe weather exposure (i.e., lightning storms, high winds, extreme heat/cold, etc)	Terminate work activities and seek shelter during lightning and high winds. In addition, heat and cold stress management techniques should be implemented when such conditions warrant (see Attachment B on heat and cold stress).
Vehicle safety concerns such as moving mobile drilling equipment over uneven terrain	Operate equipment in a safe manner at a speed suitable for the terrain.
Dust generation hazards	Use appropriate respiratory equipment during periods of dust generation; implement dust abatement measures when practical.
Damage to hearing from repeated exposure to excessive noise levels	Use hearing protection when noise levels exceed 85 dBA. Locate or isolate machinery to minimize worker exposure.
High work hazards	Proper equipment maintenance (i.e., inspection of equipment daily, etc) and applying proper equipment handling procedures.
Equipment hazards that may result in personal injury due to improper use, malfunctioning, or other causes	Proper equipment maintenance (i.e., inspection of equipment daily, etc) and handling procedures, use of appropriate PPE, and adherence to detailed work procedures. No site personnel shall be allowed beneath loads handled by lifting or digging equipment.

Table A-1 General Safety Concerns

Hazard	General Control Measures
Injuries from hot work	Use appropriate PPE and follow hot work procedures; Use special desert environment precautions.
Confined space hazards	Utilize Confined Space Program Material.
Electrical safety hazards	Use appropriate PPE. Follow procedures for Lockout/Tagout, grounding, de-energizing equipment, inspection requirements.
Excavation hazards	Do not exceed recommended depth or slope. Use trench boxes.
Injuries from material handling and storage	Use proper lifting techniques, equipment operation guidelines.
Combustible liquid hazards	Store combustible liquids in approved cans and storage cabinets. Ensure chemical compatibility. Label chemicals properly. Control ignition sources.
Injuries from construction of portable and temporary structures	Use tools and equipment properly, use appropriate PPE, consider area conditions (wind, temperature, slope).
Drilling rig hazards	Use appropriate PPE, be alert, be aware of operating machinery. Assure equipment is inspected and maintained properly
Biohazards	Use appropriate PPE and procedures.
Hand and foot injuries	Use appropriate PPE and procedures.
Dermatitis	Use appropriate PPE and procedures; Use non-irritating chemicals when practical.
Hazardous materials injuries	Use appropriate PPE and procedures; use low hazard material when practical.

Table A-1 General Safety Concerns

Hazard	General Control Measures
Hazards associated with incompatible chemicals	Ensure chemical compatibility and storage requirements.
Power tool injuries	Follow electrical and equipment safety guidelines. Inspect equipment before use.
Falls from ladders	Use approved ladders properly.

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ATTACHMENT 2

HEAT AND COLD STRESS

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1.1 Heat Stress

Heat stress is caused by various factors that include: environmental conditions; the type of clothing being worn (including PPE); workload; and, a person's individual physiological characteristics. Susceptibility to heat stress can vary between individuals depending on factors such as lack of physical fitness, obesity, alcohol and drug use, age, rest and others. Since the occurrence of heat stress depends on these factors, all personnel should be monitored.

1.1.1 Heat Stress Monitoring

For individuals wearing permeable clothing (standard clothes and work clothing), recommendations for monitoring requirements (including work/rest schedules) are detailed in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value booklet. For semi-encapsulating protective clothing these standards can't be used directly. However, correction factors for this type of protective clothing are listed in the above reference. Under these conditions, the work party members should be monitored for signs of heat stress when the work area temperature is above 82 degrees Fahrenheit (°F). Environmental monitoring should be periodically performed using a wet bulb globe thermometer.

The HSO or a medical team member should perform monitoring for heat stress during rest periods. Additional heat stress monitoring should be accomplished utilizing the buddy system. Work party members are trained to recognize the symptoms of heat stress. Work party members should monitor each other for the symptoms of heat stress during the work evolution. During rest periods from site work activities, the heart rate, deep body temperature and, if practical, body water loss should be monitored when conditions warrant. Additional guidance on this type of monitoring requirements along with recommended work/rest schedules are provided in the OSHA/NIOSH/EPA/USCG Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. These guidelines are summarized below.

- The heart rate should not exceed 110 beats/minute at the beginning of the rest period. If this rate is exceeded, then the work cycle should be reduced by 1/3.
- The deep body temperature (about one °F higher than the oral temperature) should not exceed 100.6 °F at the end of the work period (an ear temperature probe unit for monitoring deep body temperature can be used for this purpose). If this temperature is exceeded, the work cycle must also be reduced by 1/3. No work party member is allowed to wear semi or impermeable clothing if their deep body temperature exceeds 101.6 °F.
- If it is practical to obtain an accurate body weight (within 0.25 lbs) then the weight should be measured at the beginning and the end of each work day (providing the individual is wearing similar clothing). The weight loss recorded should not exceed 1.5% of total body weight in a work day.

1.1.2 Heat Stress Prevention

Preventive measures and proper training will help avoid serious heat stress related illnesses. To avoid heat stress the following steps will be taken.

- Adjust work schedules (i.e., modify work/rest schedules in accordance with the above monitoring requirements).
- Provide shelter or shaded areas for the protection of site workers during rest periods.
- Maintain worker's body fluids at normal levels. The fluid intake must approximately equal the amount of water and electrolytes lost in sweat. The following steps will be taken to accomplish this.
 - Maintain water temperature at 50 to 60 degrees F
 - Have the workers drink 16 ounces of water or dilute drinks (i.e., fruit juice, electrolyte solutions such as Gatorade) prior to commencing work activities
 - Urge workers to drink eight ounces of dilute drinks at each rest period
 - Weigh workers before and after work to determine if fluid replacement is adequate
- Encourage workers to maintain an optimal level of physical fitness. Acclimatize workers to site work conditions where indicated.

Site personnel should be trained to recognize the signs and symptoms of heat stress and then be able to take appropriate action. Many of these signs and symptoms are covered in the OSHA/NIOSH/EPA/USCG Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Some of the signs and symptoms are described below.

1.1.1.1 Heat Exhaustion

Signs and Symptoms:

- Pale, cool, and moist skin;
- Heavy sweating;
- Light-headedness;
- Slurred speech;
- Weakness (fatigue);
- Confusion;
- Fainting;
- Nausea.

Corrective Action:

- Remove victim to a cool and uncontaminated area;
- Remove PPE;
- Cool the victim with water and/or fanning;
- Give water to drink as soon as reasonably practical;
- Allow victim to rest.

1.1.1.2 Heat Stroke

Signs and Symptoms:

- Red, hot, usually dry skin;
- Lack of or reduced perspiration;
- Incoherent, delirious;
- Mental confusion and dizziness;
- Unconsciousness;
- Staggering gait;

Corrective action:

- Obtain medical help immediately;
- Remove victim to a cool and uncontaminated area;
- Remove PPE;
- Cool the victim with water and/or fanning;
- Give water as soon as practical;
- Transport to medical facility for further treatment since Heat Stroke is a medical emergency.

1.2 Cold Stress

The effects of extreme cold exposure (low temperatures and when the wind chill factor is sufficiently high) are frostbite, hypothermia and impaired work ability when working at a hazardous waste site. Some of the control measures include the use of appropriate clothing, the availability of warm shelter, and the careful scheduling of work/rest periods. These control measures should be taken to help prevent the worker's deep body temperature from falling below 96.8 degrees F.

An early warning to the danger of cold stress is pain in the extremities. During prolonged cold exposure, maximum severe shivering develops when the body temperature has fallen to 95 degrees F. This must be taken as a danger sign and exposure to cold should be immediately terminated. For additional guidelines on evaluation and control of cold stress refer to the ACGIH TLV booklet.

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Appendix I
Construction Quality Assurance Plan
For the
OU 8-08 Engineered Cover Construction Phase

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1.0 PROJECT DESCRIPTION

This Construction Quality Assurance (CQA) Project Plan provides the specific Construction Quality Assurance and Construction Quality Control (CQA/CQC) requirements for the construction of three engineered covers at OU 8-08 Sites NRF-12B/NRF-14, NRF-19, and NRF-21A. Site NRF-12B the S1W Leaching Pit; Site NRF-14 is the S1W Leaching Beds; Site NRF-19 is the A1W Leaching Bed; and Site NRF-21A is the Old Sewage Basin. Each site received radioactive effluent in the past from routine NRF operations. A detailed description of these sites is provided in Section 2 of the RD/RA-II Work Plan. The objectives of the NRF engineered cover construction are discussed in Section 3 of the RD/RA-II Work Plan.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The NRF Environmental Remediation (ER) department has the prime responsibility for remedial action activities. Figure I-1 identifies lines of authority, lines of communication, the organizations, and interfaces of organizations responsible for the various aspects of remedial action quality assurance at NRF. The Figure I-1 Program/Waste Area Group (WAG) Manager is also the head of the NRF ER department.

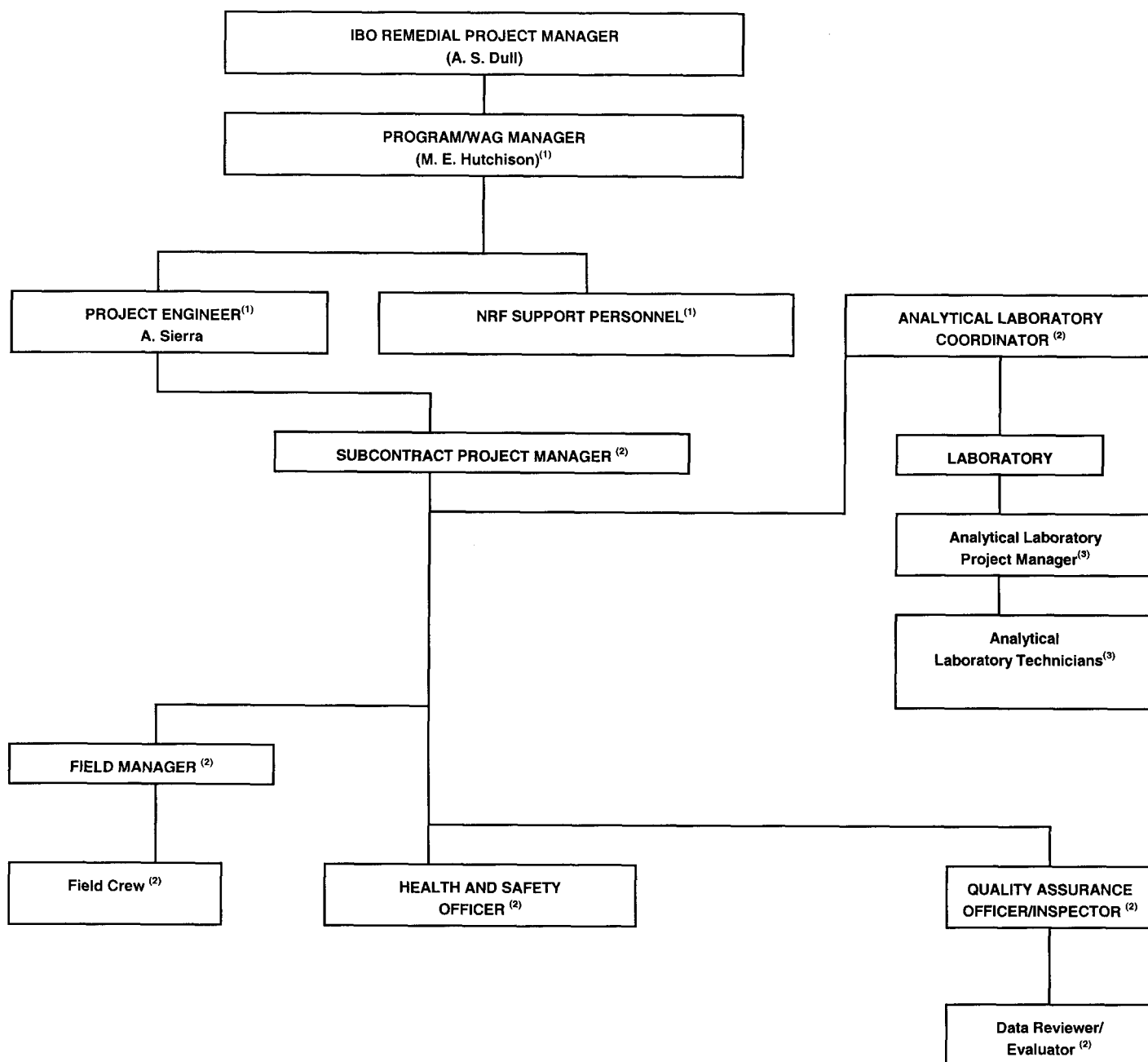
2.1 Remedial Project Managers

The Remedial Project Managers (RPMs) have the overall responsibility for all phases of the RD/RA specific to the four identified OU 8-08 sites. At the present time, the EPA RPMs are Mr. Wayne Pierre and Ms. Kathy Ivy (WAG-8 Manager) of Region X in Seattle, Washington. The RPMs for the State of Idaho are Mr. Dean Nygard and Ms. Margie English, WAG-8 Manager. The RPM for the Idaho Branch Office (IBO) of DOE Naval Reactors is Mr. Anthony Dull.

2.2 NRF Environmental Remediation

The NRF ER department is the lead NRF organization responsible for the successful implementation of the remedial action presented in the RD/RA-II Work Plan, including the preparation, revision, and implementation of this CQA Plan. These responsibilities include:

- Reviewing and concurring with procedures on the RD/RA construction phase activities performed by subcontractor personnel.
- Determining requirements and means for compliance and implementation of DOE orders, EPA regulations, and other ARARs.
- Performing periodic internal audits of all environmental monitoring activities when applicable to the RD/RA work plans for the OU 8-08 sites.
- Evaluating and interpreting data relating to the RD/RA-II Work Plan for the OU 8-08 sites.
- Maintaining documents and document control of all data and records involving the RD/RA-II Work Plan for the OU 8-08 sites.



- (1) Bechtel Bettis, Inc. Personnel
- (2) Field Subcontracted Personnel
- (3) Analytical Laboratory Subcontractor Personnel

Figure I-1 Organizational Chart for Conducting the OU 8-08 Engineered Cover RD/RA

2.3 Construction Quality Assurance Officer/Inspector

The CQA Officer/Inspector will be an employee independent of the construction subcontractor. This individual will be responsible for overseeing activities of others who are performing functions essential to maintaining the quality of the OU 8-08 RD/RA engineered cover construction activities. Responsibilities include:

- Reviewing this CQA Plan as well as the engineered cover technical specifications for proper compliance and implementation.
- Scheduling and coordinating CQA/CQC inspection activities.
- Reviewing procedures, design documents, and procurement documents for inclusion of quality requirements.
- Ensuring that proper procedures are followed.
- Ensuring that testing laboratories are conforming to CQA requirements and procedures, and ensuring that sample custody procedures are followed.
- Confirming that test data are accurately reported and that the test data are maintained for later reporting.
- Preparing and issuing audit reports and corrective action reports periodically, relating to the performance of the OU 8-08 engineered cover construction activities.
- Confirming that the engineered covers were constructed in accordance with the approved technical specifications.

In the event of nonconformance with the specifications or CQA Plan, the CQA Officer/Inspector shall notify the cognizant NRF Environmental Remediation engineer as to the details and, if appropriate, recommend work stoppage and any remedial actions necessary.

2.3.1 CQA Officer/Inspector Qualifications

The CQA Officer/Inspector shall be responsible for overseeing the construction quality of the landfill covers and ensuring compliance with the Quality Assurance/Quality Control (QA/QC) aspects of this specification. The CQA Officer/Inspector shall also be responsible for providing reports to Bechtel Bettis describing all construction quality control problems encountered, and corrective actions taken associated with the landfill covers. The CQA Officer/Inspector shall have a degree in civil engineering and at least five years of experience in the field in the construction of engineered covers, or an alternative degree and/or experience as approved by Bechtel Bettis and the Agencies.

3.0 QUALITY ASSURANCE OBJECTIVES

The objective of the CQA is to ensure that the final product (the engineered covers) meets specifications. The objective of the CQC is to control the construction process to meet project specifications. CQA includes inspections, verifications, audits, and evaluations of construction materials (i.e., soil types as described in the specifications) and workmanship necessary to determine and document the quality of the engineered covers. CQA refers to measures taken by the responsible CQA personnel to assess if compliance with the specifications has been achieved. CQC includes the specification of required soil tests (also known as CQC tests) to be performed. The RD/RA-II Work Plan Technical Specifications describe and include necessary instructions to achieve the required quality of compliance.

4.0 ENGINEERED COVER PLACEMENT AND SOIL SAMPLING PROCEDURES

Engineered cover placement and geotechnical soil sampling activities associated with the selected remedy are discussed in the RD/RA-II Work Plan. Listed below is a summary of this effort. Standard ASTM procedures will be used during the sampling evolutions to ensure that all soil samples are collected and analyzed properly.

4.1 Site Preparation and Removals

- The specific procedures for site clearing and removal of structures and debris are presented in the Technical Specifications. The work includes the clearing and removal of all vegetation, and removal of debris. The structures to be removed at these sites include fencing and any other obstacles.
- The specific procedures for sub-grade preparation to provide a stable engineered cover base are discussed in the Technical Specifications. The work will include the placement and compaction of fill material for the engineered cover base. The fill shall be compacted to a target compaction of 95% but no less than 90% of maximum density with a final top slope of 3%-5%. The compaction test method to be used to ensure conformance with the specifications is ASTM 698.
- The specific procedures for removal and disposal of materials are detailed in the Technical Specifications and are in the Waste Management Plan.

4.2 Engineered Cover Installation

- Cover material requirements are discussed in Section 4 of the RD/RA-II Work Plan and detailed in the Technical Specifications. The vegetative top soil layer shall have no greater than 30% gravel and the silt-clay content shall not be less than 30%. The maximum hydraulic conductivity shall be 1×10^{-4} cm/sec. The subsurface soil layer shall be a loam to silty clay loam and will have up to 20% gravel with particle size up to 2 inches. The in-place hydraulic conductivity shall be less than or equal to 1×10^{-5} cm/sec. The biobarrier layer shall consist of a cobble layer sandwiched between two gravel/sand layers
- The engineered cover placement requirements are discussed in the RD/RA-II Work Plan; the specific engineered cover placement procedures and

- requirements are provided in the Technical Specifications. The overall individual engineered cover thickness shall be a minimum of 6 feet. The configuration of the cover consists of a vegetative cover, an underlying subsurface soil layer, and a biobarrier. The soil component of the vegetative cover layer shall consist of unconsolidated soil (soil properties/composition requirements are as specified in the Technical Specifications) and have a maximum thickness of 12 inches. The subsurface soil layer will consist of 4 feet compacted soil as specified above. The subsurface soil layer will be placed in 6-8 inch lifts. The subsurface soil layer shall be compacted to a target compaction of 95% of maximum density (compaction value based on obtaining a hydraulic conductivity of 1×10^{-5} cm/sec or less) with a final top slope of 3%-5%. The biobarrier layer will consist of 1.5 feet of gravel/cobblestone.
- For the placement of the subsurface soil layer, measures shall be taken to prevent the soil layer from desiccating. The recommended preventive measure is to water the soil periodically. Care must be taken to water the soil uniformly so as not to create zones of excessively wet soil.

4.3 Soil Material Tests

- The Technical Specifications will contain details of the soil material tests to be performed at the borrow pit and for the covers. A summary of the tests is presented in the Tables I-1 and I-2 below:

Table I-1 Soil Material Tests for Engineered Cover Subsurface Soil Layer, Top Soil Layer Preparation, and Borrow Pit Source Material		
Parameter	Test Method	Minimum Testing Frequency
Percent Fines	ASTM D1140	1 per 1000 cu. yd. for Borrow Source and engineered cover
Percent Gravel	ASTM D422	1 per 1000 cu. yd. for Borrow Source and engineered cover
Atterberg Limit	ASTM D4318	1 per 1000 cu. yd. for Borrow Source and engineered cover
Water Content in-place	ASTM D3017	5 per acre per lift for engineered cover only
Water Content (undisturbed sample)	ASTM D2216	1 per 1000 cu. yd. for Borrow Source 5 per acre per lift for engineered cover
Permeability	ASTM D5084	1 per 1000 cu. yd. for Borrow Source 1 per acre per lift for engineered cover
Moisture-Density Curve	ASTM D698	5000 cu. yd. and all changes in material for Borrow Source 1 per acre per lift for engineered cover
Soil Density	ASTM D2922	1 per 500 cu. yd. for Borrow Source 5 per acre per lift for engineered cover
Construction Oversight	ASTM D-2488	Continuous

Table I-2 Soil Material Tests for Engineered Cover Base		
Parameter	Test Method	Minimum Testing Frequency
Soil Density (Percent Compaction)	ASTM D2922	1 per acre per lift
Percent Gravel	ASTM D422	1500 cu. yd.
Moisture Content (in-place)	ASTM D3017	1 per acre per lift
Moisture-density curve	ASTM D698	1 per acre per lift
Construction Oversight	ASTM D-2488	Continuous

5.0 **SAMPLE CUSTODY**

A documented chain-of-custody program shall be used to identify and trace samples from the point of collection to final analysis. Chain-of-custody procedures are described below and will be followed by the NRF subcontractor and the laboratory responsible for analyzing the samples.

The Chain-of-Custody form is a required document used to track the samples from collection to final analysis. The form is completed as the samples are collected and shipped, and will be kept with the samples at all times. The form must be signed by each person taking custody of the samples. Normally this form will be signed by the sample collector, the NRF sample custodian or NRF personnel receiving the samples from the collector, NRF Traffic shipping personnel, and the technician at the subcontracted analytical laboratory receiving the samples. Any movement of the samples at the analytical laboratory will be tracked with the laboratory's internal custody procedures. The NRF subcontractor will provide written instructions for the use of the Chain-of-Custody Form.

6.0 **CALIBRATION PROCEDURES**

All quantitative and qualitative measurement, analysis, and detection of materials associated with the sampling activities shall be conducted using devices that are calibrated in accordance with a documented calibration program. Field instruments used for any field checks will be calibrated daily prior to use. These instruments will be calibrated according to the manufacturer's instructions.

Laboratory instruments will be calibrated per the laboratory's established calibration procedures. The procedures shall reference the appropriate method and/or manufacturer's instructions for instrument calibration. Detailed descriptions of all laboratory calibrations, and the acceptance standards, will be included in the Subcontractor Laboratory QA/QC Manual.

7.0 **ANALYTICAL PROCEDURES**

Written procedures shall be used for analysis of all samples collected for material tests and shall delineate or reference procedures that meet or exceed, in precision and accuracy of

results, the ASTM requirements. The analytical procedures to be performed on the samples collected during this Engineered Cover RD/RA construction phase are referenced in the specific ASTM Test Procedure.

8.0 INSPECTION AND SOIL MATERIAL TEST DATA REPORTING

Inspections include borrow pit inspections during excavation of the soil material, cover inspections during the placement of the lifts of soil, and general visual inspections. Visual inspections will be conducted in conjunction with laboratory tests and are not meant to supersede or replace any actual requirements for the laboratory tests. During the borrow pit excavation of soil material, the CQA Officer/Inspector, or the qualified designated field inspector who reports to the CQA Officer, will observe all excavation of the borrow soil in the borrow pit to determine whether adequate soil material as specified in the Technical Specification is present in the borrow soil. The inspector/technician will carefully examine the soil in the field for key factors such as soil plasticity, the presence of gravel, etc. The inspector/technician will also examine the soil and collect samples to determine if the soil material is ready to be used for final construction, or if some degree of preprocessing of the soil material is necessary. The key factors for preprocessing of the soil are water content adjustment, removal of oversized particles, pulverization of clods, and homogenization of the soils.

After the soil has been inspected and is ready for final placement, the soil is to be hauled to and stockpiled at the designated OU 8-08 site. Soil should not be placed in adverse weather conditions (e.g., heavy rain, high winds, etc.). Therefore, inspectors are responsible for documenting weather conditions in a daily logbook during all earthwork operations.

The surface on which the soil will be placed must be properly prepared as per the Technical Specification and the soil material must be inspected after placement to make sure the material is suitable. The inspector must also verify that the individual lifts do not exceed the maximum allowable thickness. After a loose lift of soil has been placed, samples shall be taken periodically (see Table I-1) to confirm the properties of the soil layer.

When conducting a visual observation, the inspector shall be close to the working face of the soil material as it is being placed. The inspector shall look for deleterious material such as stones, debris, organic matter, etc., that are not allowable as specified in the Technical Specifications for the particular soil type to be used. A continuous inspection of the placement of the soil layers will be performed to ensure that the soil material for the specified soil layer is of proper consistency per the Technical Specifications.

The inspector shall inspect the compaction equipment to ensure that the equipment will perform the compaction as specified in the Technical Specification. The inspector shall observe side-slope compaction carefully and watch for any tendency of the compactor to slip downslope or for slippage or cracking to take place in the soil. The inspector shall be watchful to make sure that adequate compactive effort is delivered to the soil. A footed roller compactor can become clogged with soil between the feet; therefore, the inspector should examine the condition of the roller to make sure that the space between feet is not plugged with soil. The inspector shall also observe that the compactor is operated at a reasonable speed.

Soil material test data reporting refers to the report generated by the laboratory that conducted the tests on the samples collected. The report will contain the quantities (test data) generated, the calculations performed as dictated by the test method, and documentation that the

analytical procedures are based on the latest versions of ASTM methods. The report will be generated by the subtier laboratory, reviewed by the subcontractor, and relayed to NRF Environmental Remediation via a written report.

All data results will be validated for accuracy and verified to be within contract specifications by independent review. Oversight of these tasks will be provided by Bechtel personnel. Items evaluated include, for example, checks of logbooks, instrument calibrations, and the procedures used for the collection and analysis of samples. Any discrepancies with the data will be noted. All notes and resolutions will be reported to NRF Environmental Remediation. NRF will perform an additional independent audit as a quality check of the soil material test data.

9.0 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits shall be initiated for both the field and laboratory work. System audits are required to monitor the capability and performance of the entire OU 8-08 RD/RA engineered cover construction activities. Scheduled and unscheduled audits shall be performed on a bi-monthly basis to ensure accuracy and adherence to procedures.

The responsibility for evaluating the performance of field activities, in accordance with this CQA Plan, is that of the project manager, project engineer, and field team leader. Field audits will be conducted to verify that the operational procedures are in accordance with the RD/RA-II Work Plan, verify the collection of all samples, verify that the documentation is in order and in sufficient detail, determine any existing discrepancies, and implement corrective actions. As a regular part of the laboratory QA/QC program, performance and system audits will be performed on a routine basis in accordance with the laboratory QA/QC Manual.

10.0 PREVENTIVE MEASURES/MAINTENANCE

Preventive maintenance shall be scheduled for equipment and operations for both the field and laboratory areas. Field equipment shall be inspected prior to use to ensure it is operational. For laboratory equipment, preventive maintenance will be performed on a routine basis for each analytical instrument in accordance with the laboratory's preventive maintenance program and manufacturer's instructions.

11.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA

All measurement data shall be routinely assessed. Field water content or density testing for soil may produce a failing result (i.e., value outside of the specified range) due to various reasons including human error, natural variability of the soil, an anomaly at an isolated location, etc. In addition, tests on soil liner materials may occasionally fail the specification requirement. This may be due to the existence of occasional imperfections in the soil liner (such as pockets of sandy material within the lift). Taking these into account, the allowable maximum percentage of failing tests is presented in Table I-3.

Table I-3 Maximum Percentage of Failing Tests	
Parameter	Maximum Allowable Percentage of Outliers
Compaction Tests	
Water Content	3% of total data, provided outliers not concentrated in one lift or one area, and provided no water content less than 2% below or more than 3% above the allowable value
Dry Density	3% of total data, provided outliers not concentrated in one lift or one area, and provided no dry density more than 0.8 kN/m ³ (5 lbs/ft ³) below the required value
Soil Material Tests	
Atterberg Limits	5% of total data, provided outliers not concentrated in one lift or one area
Percent Fines	5% of total data, provided outliers not concentrated in one lift or one area
Percent Gravel	10% of total data, provided outliers not concentrated in one lift or one area
Clod Size	10% of total data, provided outliers not concentrated in one lift or one area
Hydraulic Conductivity	No greater than one-half order of magnitude above the target maximum value

12.0 CORRECTIVE ACTION

A list of corrective action measures shall be established to ensure that any problems are identified and either controlled or corrected. Corrective action measures are to be defined in the technical specifications for activities in which noncompliance with procedures, data, and/or test results is detected. Corrective action may be initiated as a result of other CQA/CQC activities that indicate a potential problem area may exist.

If a determination has been made that the soil materials in an area do not conform to the specifications, the first step is to define the extent of the area requiring repair. The contractor shall then repair the lift of soil to ensure compliance with the CQC/CQA criteria. Perform additional tests as necessary to define the limits of the area that requires repair.

For instance, the corrective action for failed hydraulic conductivity soil tests, in an area of a designated lift, is to re-test the area by taking two samples in the same vicinity as the failed test. If either of these two fail, then the area shall be repaired. The hydraulic conductivity test may have failed due to poor quality of the soil (too much sand or gravel as determined from particle size distribution) or due to poor compaction (as determined from compaction tests and moisture contents). If due to poor soil quality the soil must be replaced, if due to poor compaction, then re-compact the soil with any required treatment (i.e., additional passes by the compactor and/or additional moisture may be required).

If the water content is determined to be incorrect as determined by the soil test results (typically from field tests by the nuclear method), wet or dry the loose lift of soil in place. If the soil contains oversized material, remove oversized particles from the material. If the clods are too large, pulverize clods in the loose lift. If the soil lacks adequate plasticity, contains too few fines, or contains too much gravel, the material is to be excavated and replaced. If adequate compaction of the soil has not been achieved, the contractor shall attempt to rectify the problem with additional passes of the compactor over the problem area, followed by additional compaction tests; replacement of the lift shall be necessary if specifications cannot be met.

13.0 QUALITY ASSURANCE REPORTS

Reports will present data in the form of tables, graphs, and maps as needed to show sample parameters by measured values, location, depth, spatial variation, and statistical evaluations performed. Daily inspection/summary reports on inspections and observations of the work and progress made will be prepared by the field CQA inspector and field manager. Any abnormal or unexpected results will be noted and discussed. Major problems will be discussed during Remedial Project Manager teleconferences.

14.0 STATUS REPORTS

The INEEL FFA/CO requires a monthly status report. In this report the project status and significant problems will be addressed. The complete material test data packages will be available at NRF for detailed review upon request.

Appendix J

State and EPA Comments (Phase II Draft Remedial Design Work Plan)

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**IDEQ Comments on the March 5, 2001
Draft Phase II Remedial Design Work Plan
for Operable Unit 8-8**

General Comment

- 1) It is our expectation that the 90 percent design (RD/RA Work Plan) will present a geotechnical evaluation to show that the newly proposed stacking areas have sufficient load bearing capacity to prevent excessive subsidence after waste placement. Excessive subsidence could produce adverse cover effects such as ponding, erosion, and fissures. Compaction of these newly proposed stacking areas may be required prior to disposal of wastes in these areas.

NRF Response

NRF plans on performing a geotechnical evaluation of the newly proposed stacking areas prior to placement of the soft-sided containers and of the entire area to be encompassed by the proposed cover prior to its placement. The geotechnical evaluation will include a compaction test in accordance with ASTM 2922. The minimum compaction criteria will be 90% of maximum density and the test will be performed at a minimum frequency of one per 500 cu. yd. This information will be included in the RD/RA Work Plan.

Specific Comments

- 2) **Section 3.1.1, Figure 2, Page 6**

Comparison of this figure with Figure 3 from the Attachment to the February 26 letter from T. Bradley to D. Nygard and W. Pierre, suggests that the footprint of the proposed cover area has shifted south and east, from the conceptual design presented in the Phase I RD/RA Work Plan. For example, areas in the northwest that were previously encompassed by the original cover design, now appear to be outside of the newly proposed cover area. Please provide clarification regarding this observation. The proposed cover must be designed to contain areas where contamination at NRF-14 and/or NRF-12(b) soils exceed cleanup goals.

NRF Response

The northwest area that was expected to be encompassed by the original cover design was based on double stacking throughout the entire northwest portion of the leaching bed. That action would have required the cover to encompass the area as presented in Figure 3 of the referenced letter. The newly proposed cover plan envisions double stacking only about three-quarters of the northwest area. The newly proposed cover perimeter will encompass all of the remaining contaminated soil, based on the confirmatory sampling results that were obtained from the excavation of the pipe leading to the northwest S1W Leaching Bed. The excavation of this pipe revealed no evidence of leakage, and included pipe removal up to approximately 15 feet from the leaching bed berm.

3) Section 4.1, Page 13, Second Paragraph

We are unfamiliar with the reference “ESRF, 1999.” Please include a list of references cited in this document. We assume that a complete discussion of the results of the cover studies will be provided in the RD/RA Work Plan to support a 90 percent design.

NRF Response

The list of references that includes the details of reference ESRF, 1999 is located just before the introduction, on page vi. A complete discussion of the results of the cover studies as detailed in this reference document, including any updates, will be provided in the Phase II RD/RA Work Plan.

4) Section 6.0, Pages 14 through 18

The IDEQ became a State Department in July, 2000, and is no longer a Division under the Department of Health and Welfare. Consequently, all of the old IDAPA 16 series rules were re-designated as IDAPA 58 series. For example, former IDAPA 16.01.05.008 is now IDAPA 58.01.05.008. Idaho’s administrative rules are available at <http://www2.state.id.us/adm/adminrules/>.

We recommend that Table 1 designations remain unchanged for consistency with the 1998 OU 8-8 Record of Decision. However, we request that a statement be added to the text clarifying that the IDAPA rules identified as the 16 series are in fact referring to what is currently the 58 series rules.

NRF Response

Comment will be incorporated by adding the following as a footnote to the table: “The IDAPA rules identified as the 16 series in the 1998 OU 8-08 Record of Decision, and in this Table for consistency, are in fact referring to what are currently the 58 series rules (reflecting changes within the State of Idaho departmental organization since the time the ROD was signed).”

5) Section 6.0, Table 1, Page 15

Please add the following Action-Specific ARAR to the table: Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities [Specific Appropriate Federal Regulation Sections: Surveying, Closure, and Post-Closure Care for Landfills] IDAPA 16.01.05.008 [40 CFR 264.309 (a), 40 CFR 264.310 (a) (1) through (5) and 40 CFR 264.310 (b) (1), (4), (5), and (6).]

NRF Response

Comment will be incorporated as stated. A line item for this Action-Specific ARAR will be added to the table.

6) Section 8.0 , Pages 19-20, Last Sentence on Page 19

Please note that IDEQ and USEPA concurrence must be obtained for major modifications to a design presented in a finalized primary document, in accordance with Sections 8.21 and 8.22 of the Federal Facility Agreement/Consent Order.

NRF Response

Comment will be incorporated with the following revision to the referenced sentence: "...reviewed and approved by NRF, with concurrence by the Agencies, prior to use."

7) Section 10, Pages 20-21

This section should discuss and present the increased costs resulting from greater than anticipated volumes of contaminated soils requiring excavation. The text should compare the current revised estimate to the original ROD estimate, so that there is an understanding of whether the remedial action is proceeding within USEPA's recommended acceptable cost ranges (i.e., + 50 percent, - 30 percent).

NRF Response

The cost estimate in the Phase II RD/RA Work Plan will include the additional cost for the greater than anticipated volumes of contaminated soil, with a comparison to the original ROD estimate. As previously discussed with the Agencies, NRF does not envision exceeding a 50% increase at this time. The RD/RA Phase 2 cost estimate (page 21 of the work plan) addressed placement of a cover that would accommodate the additional anticipated volumes of contaminated soil.

**EPA Comments on the March 5, 2001
Draft Phase II Remedial Design Work Plan
for Operable Unit 8-08 B**

- 1) **Page 6, Figure 2:** Soft-sided containers from NRF-19 and NRF-21A are labeled in the South Leaching Bed. Do the other color-coded squares represent soft-sided containers filled with soil expected from specific sites?

NRF Response

The color-coded squares in the south leaching bed represent only the soft-sided containers that have been placed from these two sites. The other squares in the north leaching bed are there to estimate the number of soft-sided containers that can be placed in this bed within a single layer. The different color scheme for some of the squares indicates that the bags to be placed after the storage area is near capacity will have to be placed slightly different than the others due to mobility restrictions by the presence of the other bags. This color scheme was included strictly for planning and estimating purposes.

- 2) **Page 9, Section 3.3, second paragraph, last sentence:** It should be added that the 8-05/6 Landfill Areas will be included in the ICP to address the new requirements in the EPA Region 10 institutional control policy and that a letter will be submitted for this modification of the 8-05/6 RD/RA Work Plan.

NRF Response

This comment will be addressed in the Phase II RD/RA Work Plan under the ICP section, which will include the 8-05/06 Landfill Areas to address the new requirements in the EPA Region 10 institutional control policy (thereby modifying the institutional controls previously defined in the 8-05/06 RD/RA Work Plan).

- 3) **Page 18, Table 2, first column, Compliance Strategy:** It states here that any waste generated will be managed in accordance with the Waste Management Plan. However, Section 7.0 does not identify a WMP deliverable.

NRF Response

The possibility of generating radioactive waste during the Phase II work activities is small; however, if any is generated, the Waste Management Plan prepared for the Phase I work activities will be used. This will be clarified in the Phase II RD/RA Work Plan.

(Later modification: the Waste Management Plan has been updated and is included as an appendix to the RD/RA-II Work Plan.)

- 4) **Page 19, Section 7.0, paragraph 5:** The 8-05/6 Landfill Areas should also be included in the ICP.

NRF Response

The text will be modified to include the 8-05/6 Landfill Areas in the list of sites of concern to be addressed in the ICP by adding the following sentence: "The ICP will also provide guidelines for updating institutional controls at the 8-05/6 sites, previously discussed in the 8-05/6 RD/RA Work Plan, to address the new requirements in the EPA Region 10 institutional control policy." (Since updated to read, "The ICP also provides....")

- 5) **Page 19-20, Section 8.0:** EPA and IDEQ concurrence should be received prior to implementing major modifications.

NRF Response

See response to IDEQ comment 6.

- 6) **Page 21, Table 3:** Operation and Maintenance costs should be included in this table.

NRF Response

Comment will be incorporated by adding a line item for Operation and Maintenance costs below the total Phase II construction cost.

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Appendix K

State and EPA Comments

(Phase II Draft Remedial Design Report/Remedial Action Work Plan)

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Responses to IDEQ Comments on the Draft Phase II RD /RA Work Plan

1) Draft RD/RA-II Work Plan, Section 2.1, Page 2, Third Paragraph

The text should describe the current status of the former perched water bodies (i.e., they no longer exist) based on recent sampling.

NRF Response

An additional paragraph has been added to Section 2.1 explaining the current status of former perched water body areas at OU 8-08 sites.

2) Draft RD/RA-II Work Plan, Section 2.2.2, Page 4; Section 2.2.3, Page 5; and Section 2.2.4, Pages 5-6

The text should discuss the remedial investigation and post-remedial investigation (Site 21A) sampling results. These results will be used to help develop the groundwater monitoring plan.

NRF Response

Table 2-1 has been added to the Work Plan and includes maximum sample results for contaminants of concern from various sample collection efforts at the engineered cover sites. Although these results will help develop the groundwater monitoring plan, it should be noted that the groundwater pathway is not considered a pathway of concern for OU 8-08 sites.

3) Draft RD/RA-II Work Plan, Section 2.2.4, Page 6, Second Paragraph

To date, the IDEQ has not approved the OU 8-8 Explanation of Significant Differences. Therefore, the text should not indicate approval has occurred. The text could state that approval is pending.

NRF Response

The text in question was rewritten as follows: "Formal approval by the State of Idaho and the EPA on the ESD is pending."

4) Draft RD/RA – II Work Plan, Section 3.1 General Comment

This section includes several statements indicating that cover material borrow sources will preferably be in the vicinity of NRF and within the INEEL. Please identify the specific borrow sources to be used for this project. Also, material property testing is needed at each of these borrow sources to demonstrate that required parameters are satisfied. Please submit a sampling and testing plan or existing testing results, for each borrow source expected to be used for this project.

NRF Response

The potential borrow sources at the INEEL identified for this project for the underlying soil layer are Spreading Area A by the Radioactive Waste Management Complex and Rye Grass Flats. Soil material property tests have been conducted for these borrow sources and are included as Table 4 under a new section (Section 4.1.4.4 Borrow Sources for

the Engineered Covers). Material sources for the biobarrier are commercially available within the local area.

5) **Draft RD/RA-II Work Plan, Section 3.1, Page 12, Figure 4**

The figure should define the blue dashed line and the red dots on the south side of the unit.

NRF Response

The figure has been modified to define the blue dashed line as the old fence that existed when the site was in operation and the red dots as the existing fence corner posts.

6) **Draft RD/RA-II Work Plan, Section 4.1.1, Pages 14-15**

This section discusses and compares an INEEL study of alternative evapotranspiration caps with the "EPA recommended traditional cover." The IDEQ has the following specific concerns:

- a) The text should clearly specify what is meant by the "EPA recommended traditional cover," including CFR and/or guidance citations.

NRF Response

The text has been modified to clarify the meaning of an EPA recommended traditional cover. Reference to 40 CFR Part 264 and the EPA guidance document was also added to the text. The "EPA recommended traditional cover" refers to RCRA Subtitle C regulations that consist of a low hydraulic conductivity geomembrane/soil layer, a drainage layer, and a top vegetation/soil layer. This design is described in the EPA's publication entitled "Design and Construction of RCRA/CERCLA Final Covers."

- b) The IDEQ has requested copies of several of the references (i.e., Anderson and Forman, 2002; Anderson and Inouye, 2001; Pratt, 2000; and Johnson and Blom, 1997). We can not evaluate the conclusions presented herein until we have reviewed these materials. [Note: We received copies of these documents on May 14, 2002 and will be reviewing them as soon as possible. Any further comments we have regarding the conclusions presented in this section will be made informally during the resolution period, or formally on the Draft Final RD/RA Work Plan.]

NRF Response

No response necessary.

- c) Although these INEEL studies compare evapotranspiration caps to a RCRA cap, and apparently conclude that the latter is inappropriate in arid and semi-arid climates, please note that 40 CFR 264.310 (a) (5) requires that the landfill cover must have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present. **The USEPA has not developed an alternative landfill cover design for arid climates that they deem adequately complies with this ARAR.** Under the Hazardous Waste Management Act (HWMA) the state of Idaho must be as stringent as federal regulations. Therefore, the OU 8-8 cover design must have a permeability less than or equal to the permeability of the natural subsoils.

NRF Response

In order to meet the intent of 40 CFR 264.310(a)(5) per the IDEQ comment, NRF will drill at least three boreholes adjacent to or in close proximity to each engineered cover area. Soil testing data will be obtained from the natural subsurface soil below the waste zone (area most likely to have contaminants above CERCLA cleanup levels) at each site. This is expected to be at approximately the 18-20 foot depth at NRF-14/12B, 14-16 foot depth at NRF-21A, and 8-10 foot depth at NRF-19. The RD/RA-II Work Plan text has been modified to include the drilling and sampling of these boreholes.

7) Draft RD/RA – II Work Plan, Section 4.1.1, Page 15

This section, as well as others in the document, discusses the use of a capillary break in the cover system. Proper selection of material gradation is critical to the function of this type of layer. Please provide the calculation and specification detailing the specific material requirements.

NRF Response

The specification for the particle size (see Section 4.1.4.3) to be used has been revised to more accurately represent the actual particle size range that was used in the field at the actual test pads for the INEEL ET Cover Study. This size range was also that specified for the Remedial Action Work Plan for the Waste Area Group 4, CFA-08 Sewage Plant Drainfield. Since this is based on actual field test data, a calculation was not deemed necessary. The primary function of this layer is to prevent biotic intrusion and, secondly, act as a capillary break.

8) Draft RD/RA-II Work Plan, Section 4.1.2, Pages 15-16

The ARAR regarding closure and post closure care, 40 CFR 264.310 (a) (5), requires that the final cover have a permeability less than or equal to the permeability of the natural subsoils present. The intent of the regulation is to prevent pooling of infiltration in the waste zone above the natural subsoils (i.e., the “bathtub effect”), which could cause greater leachate production. Therefore, it is important to have reliable data regarding the permeability of the soils beneath the waste layer. We cannot determine if hydraulic conductivities from soil samples taken from areas north of NRF (or in NRF-1 and NRF-53) or at the RWMC are representative of subsoils beneath NRF-14, NRF-12B, or NRF-21. If there are no existing sample results collected proximal to, and at depths equal to the base of the NRF-19, NRF-14/12B, and NRF-21, then the Remedial Design must include a plan to collect samples to fill this data gap so that the final covers can be properly designed.

NRF Response

NRF will collect additional soil data from three boreholes to be drilled in close proximity to the covers at the base of each site (see Response to IDEQ Comment 6c). The text in Sections 4.1.2, 4.1.3, and throughout the Work Plan has been modified to include this soil testing and to more clearly present past investigation information.

9) Draft RD/RA-II Work Plan, Section 4.1.2, Page 18, Second Sentence

Please delete this sentence. It is probably not a question as to whether the leachate will reach the aquifer, but rather if it will carry contamination from the covered sites at concentrations that will adversely impact the aquifer quality. Given the relatively short half-lives of the OU 8-8 contaminants that exceed risk-based levels (i.e., cesium-137 and

strontium-90), their sorption coefficients, and the expected infiltration rate, it is unlikely that an adverse impact would occur. Please modify the text.

NRF Response

This sentence has been deleted.

10) Draft RD/RA – II Work Plan, Section 4.1.3, Page 18

This section states that the base material to be used will provide support for the remaining cover layers. Please state the minimum thickness of this base layer.

NRF Response

The next to last sentence in Section 4.1.3 has been modified to read as follows: "...and have a minimum depth of one foot."

11) Draft RD/RA-II Work Plan, Section 4.1.4, Page 20, Figure 5

a) Please add a scale to this cross section.

NRF Response

Since this is a general engineered cover configuration, the scale will not be typical for all sites. However, a portion of the cover has been magnified to indicate the required thickness for each layer.

b) This figure illustrates the general engineered cover configuration. Please indicate what the minimum distance requirement is between the toe of the cover and the lateral extent of the underlying waste.

NRF Response

The minimum distance requirement between the toe of the cover and the lateral extent of the underlying waste is 30 feet. This dimension has been added to the figure.

12) Draft RD/RA – II Work Plan, Section 4.1.4.1, Page 19

This section states that the topsoil layer will be 6 to 12 inches thick. Also found in this section is a list detailing the species of vegetation that will be planted on the surface of the cover. Please provide information that indicates that cover performance will not be compromised due to root invasion of the underlying soil layer.

NRF Response

Although the effects of root invasion into the underlying soil layer were not addressed directly in the INEEL ET Cover Study, this study did address the fact that roots did penetrate the underlying soil layer of the covers tested. However, the underlying soil layer did perform effectively as a water storage unit with sufficient capacity to store water even under wet precipitation scenarios. The study also noted that the biobarrier was effective in reducing root intrusion beyond this layer. Another study conducted at DOE sites in New Mexico and Oregon indicates that increased infiltration can occur when the vegetation dies and the roots rot out, leaving voids. With the use of native drought tolerant plant species, this effect is minimized. An additional paragraph was added to Section 4.1.4.1 to discuss the potential effects of root invasion.

13) Draft RD/RA-II Work Plan, Section 4.1.4.2, Page 21, Fourth Sentence

This sentence requires clarification. The text should describe how the model outputs confirmed that the subsurface layer design was adequate. This is a subjective determination, so the text should identify how this decision was made.

NRF Response

The text for the sentence identified in the comment has been modified to read as follows: "...for this layer (i.e., no leachate production for normal precipitation scenario and low leachate production rates for wet precipitation scenario)."

14) Draft RD/RA – II Work Plan, Section 4.1.4.2, Page 21, Sixth Sentence

This section states that the compaction effort to be achieved is 90 percent of maximum density. Please provide the material testing data to support this. Of interest are the moisture-density curves generated from Proctor testing of the specific soils to be used. This information is needed to identify optimum moisture content and compaction effort required to obtain the permeability requirements for this entire layer.

NRF Response

The supportive information for adequate compaction in achieving the permeability requirements for this layer is contained in a new Table 4-2 in Section 4.1.4.4 that identifies the borrow source material for this layer. The data contained in the table shows the permeability target (1E-5 cm/sec) is achievable at a compaction of 95% of maximum density using the standard Proctor method (ASTM 698). Other tests will be conducted for this project at a compaction of 90% of maximum density to verify that the permeability targets are achievable at the specified minimum compaction requirement. Therefore, the text has been modified to read that the target compaction is 95% of maximum density.

15) Draft RD/RA – II Work Plan, Section 4.1.4.2, Page 21, Second Paragraph

This section states that the minimum slope for the subsurface layer is 3 percent. Please indicate the maximum allowable slope for this layer as well. This comment is general in nature and applies to all other instances of slope requirements in the document. For example, Section 4.1.4.3.

NRF Response

The text has been modified to read, "with a maximum slope of 5 percent" everywhere the text mentions the minimum slope requirement. In addition, the minimum slope has been changed to 2 percent, per EPA comment 4.

16) Draft RD/RA-II Work Plan, Section 4.2.1, Page 21, Second Sentence

Please indicate in this section what analyses will be performed on the soil and vegetation samples, or reference the portion of the document that presents this information.

NRF Response

The text in the next to last sentence in Section 4.2.1 has been modified to read as follows: "...and moisture monitoring (including the specific analyses to be performed on soil and vegetation samples) are included in the O&M Plan (Appendix C)."

17) Draft RD/RA-II Work Plan, Section 4.2.1, Page 22, Figure 6

- a) Given the shallow depths that will be evaluated for soil moisture (< ten feet) the use of a four foot wide concrete pad around the tube seems excessive and would not provide soil moisture measurements representative of areas fully exposed to precipitation. The 4ft. X 4ft. X 4in. concrete pad surrounding the tube will modify infiltration around the tube and should be eliminated from the design. The soil cover surrounding the tube should be as similar to the rest of the cover as possible to provide representative data.

NRF Response

The figure has been modified to eliminate the 4ft. X 4ft. X 4in. concrete pad surrounding the tube.

- b) Figure 6 also shows conventional well protection by using a larger well casing that extends above the cap of the neutron access tube and that extends to a depth of about 2 feet below the soil surface with a grouted annular space. It is recommended this feature also be deleted since it too will affect infiltration along the neutron access tube, although to a much lesser degree than the pad. The total thickness of the soil layer is approximately 4 feet. Alternative methods to seal this access tube should be considered so that moisture content can be measured in the soil for more than the remaining two feet. The steel neutron access tube can be protected using protection posts set several feet from the tube.

NRF Response

The outer casing has been eliminated. A cap that accommodates a padlock will be utilized to seal the opening of the access tube. The four protective bollards will be at least three feet from the tube.

- c) The text, Section 4.1.4.3, describes the biobarrier layer as a 1-foot thick cobble layer (6-12 inch diameter) sandwiched between gravel layers (1/2 inch average diameter) that are each about 4 inches thick. Section 4.2.1 states the tube will penetrate to the "support base layer of the covers..." which is below the biobarrier. It is difficult to comprehend how the tube will be pushed through the gravel and cobble layers to reach the "support base layer". Please provide some information pertaining to the method that will be used to penetrate these layers while maintaining good contact with the overlying soils and the tube which is needed to get good soil moisture data when logging.

NRF Response

NRF intends to place the tube in the required location while constructing the cover around it, as done during the INEEL ET Cover Study. Portable mechanical compaction devices will be used around the access tubes for compaction of the soil for every lift. This will be part of the technical specification submitted to the agencies for concurrence per the schedule in Appendix G.

18) **Draft RD/RA-II Work Plan, Section 5.0, Page 23**

Although not specified in the ROD, it would be helpful to define the needed design life of the cover based on the contamination assumed to be present in the areas that will be covered.

NRF Response

The design life was conservatively stated in the ROD (in the response to comments section under Part III) as 365 years, and was based on the highest concentration of cesium-137 (7,323 pCi/g) detected at any OU 8-08 site at the time. The sixth bullet under performance goals was modified as follows: 'Placement of adequate cover to inhibit erosion by natural processes for the specified design life (365 years) of the cap.'

19) **Draft RD/RA-II Work Plan, Section 6.0, Pages 25-27, Table 6-1**

- a) **Line Items 40 CFR 261, 262.11, 40 CFR 268, 40 CFR 300.440, Compliance Strategy:** It is stated that *"only small amounts of debris are anticipated from the removal of current fencing and grubbing activities."* However, section 4.1.3 states that the *"asphalt cover currently over NRF 12B will be broken up and removed."* Therefore, demolition of the asphalt cover could generate moderately large volumes of debris that may have been in contact with the pit wastes. This table should outline the compliance strategy for addressing the ARARs for this asphalt waste stream.

NRF Response

The appropriate lines under the "Compliance Strategy" section have been modified to address this concern. The asphalt debris will be handled in accordance with the waste management plan.

- b) **Line Items 40 CFR 264.309 and 310:** The table should outline each one of the requirements, and how the remedial action will comply with those requirements.

NRF Response

Each line item identified by 40 CFR 264.309 and 310 has been included in the table along with how the remedial action will comply with those requirements.

20) **Draft RD/RA – II Work Plan, Section 9, Page 30**

This section is unclear with respect to Agency review of the design drawings, CQA plan specifics (see Comment #'s 42, 43, 44), and technical specifications. These are necessary components of the remedial design, and should be included in the RD/RA Work Plan submittal. It is necessary that these documents undergo Agency review and approval prior to construction. Note that technical specifications were included in the RD/RA work plan for the OU 8-5/8-6 landfill cover remedial action.

NRF Response

Since the actual construction activities are about two years away, NRF felt that changes could occur that might impact the technical specifications. Therefore, NRF intends to draft the technical specifications within a date that is somewhat closer to the start of the construction process but prior to the bid process for the selection of a contractor and

intends on submitting the technical specifications to the regulators for concurrence per the schedule shown in Appendix G. The technical specifications will be submitted as a modification to the Phase II RD/RA Work Plan primary document in accordance with the FFA/CO. The text in Section 9.0 has been modified to identify the concurrence for the technical specifications.

21) **Draft RD/RA-II Work Plan, Appendix C, Section 2.1, Page C-3, First Paragraph**

Initially, it would be prudent to inspect the covers after significant precipitation events to determine if significant erosion or run-on has occurred.

NRF Response

NRF agrees and a sentence has been added to the text in the second paragraph to read as follows: "An inspection of the covers will be conducted after a significant precipitation event (from thunderstorm or prolonged rain event of more than one day steady rain) to determine whether significant erosion or run-on/runoff has occurred, so that any necessary repairs can be performed as soon as practical."

22) **Draft RD/RA-II Work Plan, Appendix C, Section 2.1, Page C-3, Second Paragraph**

- a) The text should state the method to be used for any re-seeding. The seeding method proved to be a very important for establishing vegetation on the OU 8-5/8-6 landfill covers.

NRF Response

The drill method will be used for any re-seeding. The text will be modified to read as follows: "Re-seeding (by the seed drill method) shall be done as needed to re-establish vegetative growth."

- b) The last sentence states "...shall be repaired by placing additional fill, contouring to the...". Please replace this with the following "...shall be repaired by placing additional fill and topsoil, contouring to the..."

NRF Response

Comment has been incorporated as stated.

23) **Draft RD/RA-II Work Plan, Appendix C, Section 3.1, Page C-4, First Paragraph, Second Sentence**

Table C-1 lists the analytical parameters for the soil and vegetation samples. It is unclear whether these samples will be subjected to additional analyses. The referenced sentence states that "... any additional constituents detected will be evaluated for consideration as analytes of potential concern." The statement suggests that other analyses will be performed on the samples. Please list any additional analyses that will be performed.

NRF Response

This sentence has been deleted, since cesium-137 is the only constituent needed to be analyzed under the isotopic gamma analysis.

24) **Draft RD/RA-II Work Plan, Appendix C, Section 3.3, Page C-5, Second Paragraph**

The standard operating procedures (SOPs) for sampling should be attached to this Operations and Maintenance Plan, or general descriptions provided in this document. The IDEQ cannot concur with procedures we have not reviewed.

NRF Response

Table C-2 has been added to the text that lists the SOPs that will be used and gives a general description of each.

25) **Draft RD/RA-II Work Plan, Appendix C, Section 3.3, Page C-6, Table C-2**

Cesium-137 should be added to the sample analysis list, as it is the primary contaminant of concern. Although not mobile via aqueous transport, it could potentially be brought to the surface by biota. If this radionuclide will be quantitatively speciated by the method outlined in the Table's first line item, it should be so stated.

NRF Response

Cesium-137 will be quantitatively speciated by the method listed on the table. The table (which is now Table C-3) has been modified and lists Cesium-137 specifically.

26) **Draft RD/RA-II Work Plan, Appendix C, Section 3.1, Page C-5, Paragraph 2**

The frequency of monitoring the neutron access tubes appears adequate but it may be worthwhile for the facility to investigate the use of Time Domain Reflectometry (TDR) arrays set at multiple depths. The data logger tied to the TDR arrays can provide more frequent data than the manually monitored tubes but the TDR arrays will not provide the complete profile that can be derived from the tubes. The TDR arrays may provide data to "fill in the blanks" that occur with the manually monitored system. Also, the TDR arrays can probably be tied to a transmitter that can provide real-time data to indicate when it is appropriate to monitor the neutron access tubes to catch moisture fronts moving through the cover. The automated TDR equipment could potentially provide cost savings by reducing the frequency of monitoring the neutron access tubes while keying data collection to subsurface events.

NRF Response

NRF has looked into the use of TDR arrays. However, due to some problems that arose at other facilities with the TDR arrays, NRF decided on the sole use of neutron access tubes. NRF will re-consider the use of TDR arrays in the future if these problems can be resolved or the use of new technology provides other methods that produce real-time data with greater reliability.

27) **Draft RD/RA-II Work Plan, Appendix C, Section 3.4, Page C-6**

The IDEQ commends the NRF for including soil moisture monitoring in the remedial design. These data will allow comparison of the monitored infiltration to the predicted infiltration developed during design, to help evaluate the overall protectiveness of the remedy. Please add some verbiage as to the intended use of the soil moisture data.

NRF Response

A sentence has been added to the text in Section 3.4 to read as follows: "The data will allow comparison of monitored actual infiltration to predicted infiltration developed during the design phase. The data can also be used to help determine whether a breakthrough condition (moisture reaching the bottom of the cover) exists or is about to occur by observing the depth of the wetting front on the soil moisture profile generated."

- 28) **Draft RD/RA-II Work Plan, Appendix C, Section 4.1, Page C-8, Last Paragraph, Last Sentence**

Please add "*, as described in Section 4.2.*" to the end of the last sentence.

NRF Response

This comment was incorporated as stated.

- 29) **Draft RD/RA-II Work Plan, Appendix C, Section 4.1.1, Page C-9**

It is not clear whether gross alpha and gross beta are the only general indicator parameters that will be monitored. Please clarify.

NRF Response

The Five-Year Review for the Landfill Areas proposed that NRF no longer collect the general indicator constituents of gross alpha and gross beta. This proposal was based on evidence that other constituents (i.e., strontium, cesium, and cobalt), which occur in greater abundance, and which would be seen sooner than the strong alpha and beta emitters, are better indicators of contaminant migration from the landfills. Over the past five or six years, gross alpha and gross beta have not provided indispensable information. Section 4.1.1 has been deleted and other portions of the text that refer to gross alpha and gross beta sampling have been modified.

- 30) **Draft RD/RA-II Work Plan, Appendix C, Section 4.3, Page C-10, Last Sentence**

Sample collection procedures, sample container specifications, holding times, and QA/QC requirements should be included in this document. The IDEQ cannot concur with procedures/specifications we have not reviewed.

NRF Response

Sample collection procedures to be used for collecting groundwater samples are USGS procedures. A footnote has been added to Table C-6 to reflect the use of USGS procedures. Sample container specifications, holding times, and QA/QC requirements are included in Table C-6.

- 31) **Draft RD/RA-II Work Plan, Appendix C, Section 4.3, Page C-11, Figure C-3**

This figure should include a legend defining the various monitoring well symbols.

NRF Response

The figure has been updated to include a legend that defines monitoring well symbols as USGS monitoring wells and NRF monitoring wells.

32) **Draft RD/RA-II Work Plan, Appendix C, Section 4.3, Page C-12, Table C-4**

- a) Cesium-137 is a primary COC, and should be added to the sampling list. Additionally, lead should be addressed.

NRF Response

The Table has been updated to specifically list cesium-137 and lead (it is now part of Table C-6).

- b) If lead is being analyzed at these locations for the OU 8-5/8-6 remedial action, a footnote should be added to this table so indicating.

NRF Response

Lead is being analyzed at these locations mostly because it is a contaminant of concern for the engineered cover areas. Lead is listed in the O & M Plan for OU 8-5/8-6 remedial action since it was detected at these sites but was not a contaminant of concern there.

- c) Although no MCL exists for several of the analytes, a 1×10^{-4} risk-based groundwater concentration could be identified.

NRF Response

A 1×10^{-4} risk-based groundwater concentration was not calculated for these constituents. The risk calculations rely on site input parameters (assumptions on the amount ingested, crop irrigation, etc.) and goes beyond the scope of the O&M Plan.

33) **Draft RD/RA-II Work Plan, Appendix C, Section 5.0, Page C-12, Fourth Sentence under Section Heading**

Please add "*in accordance with the FFA/CO*" after "*required.*"

NRF Response

This comment was incorporated as stated.

34) **Draft RD/RA-II Work Plan, Appendix E, Section 2.2, Table E-1, Page E-2, Second Line Item**

It is unclear why non-contaminated, naturally occurring debris, such as lava rock and soils, would be sent for disposal in the CFA. Please clarify.

NRF Response

Naturally occurring non-contaminated material will not be considered waste under this context. When encountered it may be relocated, or used as appropriate. Table E-1 was updated to reflect this change.

35) **Draft RD/RA-II Work Plan, Appendix E, Section 3.3, Table E-1, Page E-2**

Please delete the fifth sentence regarding discharge of decontamination water. It is unnecessary given the discussion in Section 3.3.3, and it could be misinterpreted to

suggest that all decontamination water will be discharged to the ground regardless of its contaminant content.

NRF Response

This sentence has been deleted from the text.

36) Draft RD/RA-II Work Plan, Appendix F, Section 2, Climatological Data, Page F-1 through F-2

The discussion regarding the rationale used for selection of the wet precipitation period value of 16.7 inches/year is unclear. Please include the justification for dividing maximum monthly totals by two to yield 16.7. This value is less than 2X current average annual precipitation. Sensitivity simulations for the ICDF used 3X and 4X values. While precipitation was increased, temperature data used was present-time information. It would seem that the likelihood of other climatic parameters such as solar radiation, temperature, and potential ET would also change, but these were not varied in the modeling effort.

NRF Response

The text has been revised to eliminate the discussion of dividing the maximum monthly totals by two and state that wet precipitation period value used was 17.36 inches (2x average annual precipitation values). This value is greater than that used for the ET cap study and the modeling performed for the NRF Inactive Landfill Covers (OU 8-05/6). Because of the relatively short half-lives of the primary radionuclides of concern at the NRF engineered cover sites compared to the ICDF, the 3x and 4x values were considered unnecessarily conservative. The modeling calculations were rerun using the adjusted wet precipitation amount and temperature values from a historical 12 month wet period at the INEEL; however, solar radiation and potential ET were not varied. Solar radiation is partially accounted for in the model as a function of the temperature change, and insufficient studies or data exist to accurately assess variations in potential ET. The modeling is still considered conservative without these variations. The revised leachate numbers for the adjusted wet precipitation amount and temperature values have been included in Table 4-1 of the Work Plan.

37) Draft RD/RA-II Work Plan, Appendix F, Section 2, Soil Data, Page F-2, First Paragraph

- a) The hydraulic conductivity value of 1E-3 cm/sec. chosen for the contaminant layer seems low for a gravel/sandy soil. The values cited earlier in section 4.1.2 for NRF subsoils under the waste layer at three sites (1.9E-2 to 2.4E-1 cm/sec. for 5 of 7 samples) seem more in line with this type of material. Please provide justification for the values chosen.

NRF Response

NRF has re-run the model with the hydraulic conductivity value of 2E-2 cm/sec for the contaminant layer and provided the results in Table 4-1 of the Work Plan.

- b) Please see Comment # 8 regarding the assumed hydraulic conductivity of the natural subsoils.

NRF Response

As discussed in comment #8.

38) Draft RD/RA-II Work Plan, Appendix F, Section 2, Soil Data, Page F-3, First Full Paragraph on Page

Please provide support for the statement that *"The initial soil moisture content values calculated by the model can be too high for semi-arid and arid regions."*

NRF Response

The appropriate reference has been listed.

39) Draft RD/RA-II Work Plan, Appendix G, General Comments

a) The schedule should identify more fully what OU 8-8 work will occur in FY 2003.

NRF Response

The work to be performed in FY 2003 at OU 8-08 sites is related to the Phase I Remedial Actions, which was submitted as part of the Phase I RD/RA Work Plan. A line item has been added to the Phase II schedule showing the completion of Phase I remedial actions.

b) In several (8) places on this project schedule, IDEQ is referred to as IDHW. Please replace all references to IDHW in this schedule and the document as a whole to read IDEQ.

NRF Response

The project schedule was modified to replace "IDHW" with "IDEQ". In addition, a search through the entire document was made to ensure IDEQ is used instead of IDHW.

40) Draft RD/RA – II Work Plan, Appendix I, General Comment

Please state the minimum qualifications for the Quality Assurance Officers and Inspectors.

NRF Response

The following text has been added: "The CQA Officer/Inspector shall have a degree in civil engineering and at least five years of experience in the field in the construction of engineered covers or an alternative degree or experience as approved by Bechtel Bettis."

41) Draft RD/RA – II Work Plan, Appendix I, Section 4.3, Table I-1, Page I-5

The testing frequencies for water content (in place), water content (undisturbed sample), permeability, and soil density are given in tests required per cubic yard. Please revise these frequencies to indicate the number of tests required based on the area of soil placed, and the number to be done per lift of compaction. This comment is also to be applied to Table I-2 on Page I-6.

NRF Response

The testing frequencies for these parameters have been revised based on the area of soil placed and the number to be done per lift of compaction.

42) Draft RD/RA – II Work Plan, Appendix I, Section 8, Page I-7

The testing described in this section is somewhat confusing. Specific testing requirements for borrow sources, capillary break material, fill, and other cover system components should be placed in the technical specifications and in CQA tables. The visual testing described in this section should not supersede or replace any actual requirements for laboratory testing.

NRF Response

The text has been modified to clarify the testing described in this section by listing the required tests to be performed. The details will be included in the technical specifications, which will be submitted to the agencies for concurrence. Visual tests will be conducted in conjunction with laboratory testing and are not meant to supersede or replace any actual requirements for laboratory testing. Visual tests in conjunction with laboratory testing are recommended as mentioned in the EPA's technical guidance document "Quality Assurance and Quality Control for Waste Containment Facilities." This wording has been added to the text.

43) Draft RD/RA – II Work Plan, Appendix I, Section 11, Table I-3, Page I-9

It is unclear why the "Number of Passes" has an allowable 5% failure rate. This parameter can be directly controlled and requires no time delay for testing. Also, the allowable range of an entire order of magnitude for failure of hydraulic conductivity testing is excessive.

NRF Response

The Number of Passes listed in the Table has been deleted. The EPA's technical guidance document "Quality Assurance and Quality Control for Waste Containment Facilities" recommends that "failing samples have a hydraulic conductivity no greater than one-half to one order of magnitude above the target maximum value." This can be changed to the more stringent one-half order of magnitude above the target maximum value.

44) Draft RD/RA – II Work Plan, Appendix I, Section 11, Table I-3, Page I-9

This section states that a corrective action program will be established to clearly define corrective action measures in the event of test failures. This document will require IDEQ concurrence. Methods used to define the extent and nature of failed in-place soil testing and the actions taken to remedy the situation have direct impact on the protectiveness of this remedial action.

NRF Response

The text has been modified to specifically state the corrective actions for failed in-place soil testing. For example, the corrective action for the failed in-place soil testing for hydraulic conductivity will be to retest the area by taking two samples in the same vicinity. If either of these two fail, then the area shall be repaired. Corrective actions for other failed in-place soil testing are similar. These corrective actions will also be included in

the project technical specifications. Guidance for corrective actions to be taken for failed in-place soil testing was obtained from the EPA's technical guidance document "Quality Assurance and Quality Control for Waste Containment Facilities."

Responses to EPA Comments on the Draft Phase II RD/RA Work Plan

General Comments

1. The cover letter submitted with the final OU 8-08 Phase II RD/RA Work Plan should include a brief description of the update to institutional controls at the OU 8-05/8-06 Landfills to serve as notice of modification to a primary document, the OU 8-05/8-06 RD/RA Work Plan, as required in Section J of the FFA/CO.

NRF Response

This comment was incorporated in the submittal letter

Specific Comments

1. **Page 1, Section 1.0, paragraph 2, last sentence:** The purpose of the action should be described in terms of the Remedial Action Objectives listed in the ROD. For human health protection, this includes preventing external gamma radiation exposure from all radionuclides of concern, preventing ingestion of soil and food crops contaminated with radionuclides of concern, and preventing exposure to soil contaminated with lead. For environmental protection, this includes preventing erosion or intrusion by resident plant or animal species in contaminated soils and preventing exposure to contaminants of concern that may cause adverse effects on resident species populations. The methods used to meet the Remedial Action Objectives could then be described as providing a barrier against direct contact with the contaminated soil by potential receptors, restricting access and land use, reducing the mobility of contaminants in the environment, and performing maintenance and monitoring to ensure detection of potential contaminant migration.

NRF Response

Section 1.0 of the text has been modified to describe the purpose of the Phase II actions in terms of the Remedial Action Objectives listed in the ROD as suggested in the comment.

2. **Page 6, Section 3.0, paragraph 3:** The cover has an infiltration control component and this aspect of its performance will be monitored through soil moisture and groundwater sampling. However, it should be clarified that infiltration of contaminants to the groundwater is not included as a pathway of concern in the ROD and that the primary objective of the remedy is to prevent direct exposure to contaminated soil.

NRF Response

The first sentence in Section 3.0 has been modified as follows: "The specific remedial actions resulting from the selected remedy addressed in the ROD for the four designated sites, where the primary objective of the remedy is to prevent direct exposure to contaminated soil, are summarized below."

A sentence was added to the third paragraph of Section 3.0 as follows: "Other actions included in the selected remedy are monitoring activities, maintenance activities, and institutional controls. Soil and groundwater monitoring will be performed to monitor any potential releases from the covered areas, even though infiltration of contaminants to the groundwater is not included as a pathway of concern in the ROD. Surface soil monitoring..."

3. **Page 9, Section 3.1.1, first partial paragraph, second sentence:** This sentence should state that the “asphalt cover over NRF-12B will be broken up and removed” to make it clear that the broken asphalt will be disposed of away from NRF, not capped in place.

NRF Response

The following phrase has been added to the sentence referred to in the comment: “...and disposed of off-site away from NRF”.

4. **Page 13, Section 4.1, first paragraph, fourth sentence:** The planned surface slope for the engineered covers is 3%-5%. The INEEL ET cap study (Anderson and Forman 2002) recommends a very shallow surface slope (e.g., 2%) to ensure retention of sufficient moisture to maintain a good vegetative cover. Is a surface slope of 3%-5% expected to support a good vegetative cover under field conditions?

NRF Response

The use of a 3%-5% slope in combination with a surface gravel mulch will support a good vegetative cover under field conditions, since the gravel mulch will impede run-off (thus more moisture is retained within the cover). The current OU 8-05/06 landfill covers incorporate this slope specification and it appears that there is sufficient vegetative cover (especially at the sites outside the NRF fence). The vegetation problems noted in the Five Year Review for the Inactive Landfill Areas for NRF-1 (inside the NRF fence) had more to do with the seed planting than slope issues. In addition, due to close proximity of some of the sites to the NRF site boundary, a very shallow slope may be too intrusive by extending the cover area or resulting in too steep of a side slope. However, the shallow slope can be accommodated at Site NRF-21A. Therefore, the minimum slope requirement was changed to 2% throughout the text.

5. **Page 19, Section 4.1.4.1, fourth paragraph:** The vegetative cover mix listed in the RD/RA Work Plan includes grasses and forbs. The INEEL ET cap study also recommends shrubs as part of the vegetation cover mix. The study states that “[s]hrubs such as sagebrush and rabbitbrushes remain active late in the growing season, continuing to extract soil moisture after many grasses and forbs are senescent.” Why are shrubs not considered as part of the vegetative cover mix in the work plan? Also, there should be a description of the timing and methods that will be used to seed or plant cover vegetation.

NRF Response

The text was modified to include at least two types of shrubs. The second sentence of the fourth paragraph in Section 4.1.4.1 was modified as follows: “The plant mixture that was selected for the covers consists of at least three types of perennial grasses (bluebunch wheatgrass, great basin wild rye, and streambank wheatgrass), at least two types of shrubs (sagebrush and rabbitbrush), and at least two perennial forbs (northern sweetvetch and scarlet globe-mallow).” The method to be used to plant seed will be specified in the technical specifications and is also mentioned in the O&M Plan if re-seeding becomes necessary. The opportune time period for planting should be during the spring or fall. This requirement will be included in the technical specifications which will be forwarded to the agencies for concurrence as shown on the schedule in Appendix G.

6. **Page 21, Section 4.1.4.2:** The INEEL ET cap study used a silty clay loam in experimental plots with, on average, 19% sand, 48% silt, and 33% clay. This section does not specify a subsurface soil type and the Construction Quality Assurance Plan only states that the subsurface soil will have up to 20% gravel with particle size up to 2 inches. Specifications for the soil should be provided. Also, this section states that the subsurface soil layer will have a minimum thickness of four feet while the Construction Quality Assurance Plan describes this layer as 3.5 feet thick. This inconsistency needs to be resolved.

NRF Response

The subsurface soil type will be a loam to silty clay class. This specification for a soil type has been added to the text third sentence in Section 4.1.4.2. The governing criterion for this soil is the required hydraulic conductivity. Therefore, no other specification is given; however, Section 4.1.4.4 and Table 4-2 have been added to specifically address the expected subsurface soil type. The subsurface soil thickness of 3.5 feet stated in the CQA Plan has been modified to be consistent with this section.

7. **Page 21, Section 4.1.4.3:** The INEEL ET cap study used a particle size of 100 mm – 200 mm for cobble and 5 mm – 15 mm for gravel in the biobarrier. The 6 inch – 12 inch particle size for cobble called for in the RD/RA Work Plan seems a little large, especially considering that the cobble layer itself will be 12 inches thick. The percent particle make-up of the gravel must be such that the soil in the layer above does not mix down into the biobarrier. Also, will the bottom 4 inch thick gravel layer of the biobarrier be placed in areas where gravel fill is planned as a base material (e.g. NRF-14)?

NRF Response

The cobble specification has been change to the range of 3 inch to 6 inch particle size to be more consistent with the INEEL ET cap study and with other cover construction projects at the INEEL. The bottom gravel layer of the biobarrier is planned for all cover locations.

8. **Page 25-26, Table 6-1:** Asphalt should be listed along with fencing and grubbing materials in the “Compliance Strategy” column for ARARs that might apply to disposal of debris.

NRF Response

The “Compliance Strategy” column of Table 6-1 was modified in several places to include the asphalt.

9. **Page 29, Section 7.0:** The timing and content of five-year reviews should be described in this section and any plans to consolidate five-year reviews for OU 8-05/8-06 and OU 8-08 should be discussed.

NRF Response

A paragraph was added to Section 7.0 of the RD/RA-II Work Plan. This paragraph discusses the purpose of the five-year review, when the next review for the OU 8-08 sites is due, and the possibility of consolidating this review with the next Five-Year Review for the Inactive Landfill Areas scheduled to be completed in 2006.

10. **Page 29, Section 7.0, paragraph 1, last sentence:** It should be stated that the Remedial Action Report is also a primary document.

NRF Response

The text in the next to last sentence of the first paragraph of Section 7.0 was modified as follows: “Per the FFA/CO, a Draft Remedial Action (RA) Report, which is a primary document, will be submitted within 60 days after the final inspection.”

11. **Page 29, Section 7.0, paragraph 5, third and fourth sentences:** It states here that all of the institutional controls will generally be implemented in the future, but that the IC Plan will delineate the controls that are necessary while the current work force is present. However, the IC Plan does not adequately differentiate between those controls that are necessary while there is a government presence at NRF and those that would be required after this time frame. This should be clarified.

NRF Response

The text in these sentences has been modified to clarify the discussion. The text now states: “The ICP delineates the controls necessary at each site while a work force is present at NRF in order to prevent unnecessary exposure to contaminants and to control potential disruption of the site (i.e., proper notification and approvals before removing fence, excavating in areas for future construction, etc.). In the event that there is no longer a government presence at NRF in the future, mechanisms are in place to assure that all ICs necessary to ensure protection of human health and the environment are in force.”

12. **Page 29, Section 7.0, paragraph 7:** Drawings and technical specifications need to be included in the RD/RA Work Plan.

NRF Response

See NRF response to IDEQ comment 20.

13. **Operation and Maintenance Plan, Page C-4, Section 3.0, paragraph 1:** More information should be provided concerning the radiological survey instrument including the type of instrument that will be used, the detection capability of the instrument, and specifications for use of the instrument required to obtain appropriate detection.

NRF Response

Table C-4 has been added to the text to provide the requested information. This table is included in Section 3.3.

14. **Operation and Maintenance Plan, Page C-5, Section 3.2, paragraph 1:** It states here that surveying and sampling for radioactivity will occur on an annual basis. It might make sense to perform a more comprehensive survey with less frequency than currently planned. It would be unlikely that contaminants would migrate to the surface of the soil cover within the first year after placement of the cap unless there is obvious disturbance or erosion. Also, it states here that an assumption will be made that contaminants are migrating if there is a detection above method quantitation limits while, in Section 3.3, it states that potential contamination is indicated by a measurement greater than two times average background. This inconsistency needs to be resolved.

NRF Response

Soil and vegetation sampling, on an annual basis, for radioactivity is currently being conducted at various other locations (including the engineered cover areas) within NRF. This type of sampling and associated surveys may be revised at a later date based on an assessment of the data. The frequencies and comprehensive strategy will be addressed in the Five-Year Review. The inconsistency noted for this section has been changed to read the same as in Section 3.3: "...the detection of contaminants above two times the average background..."

15. **Operation and Maintenance Plan, Page C-5, Section 3.2, paragraph 2:** It states here that moisture monitoring will begin soon after placement of the cover to obtain baseline data. This baseline data might not be representative of cap performance if vegetation has not yet been fully established.

NRF Response

Collecting moisture data soon after placement will help establish the connection between the degree of vegetative cover and moisture in the cover. As the vegetation cover matures, soil moisture should trend towards equilibrium. Baseline will be interpreted as the equilibrium portion of the moisture curve. During the early stages of vegetation growth, the condition of the cover may approximate the recovery period after a drought or a fire. The following words were added to the second paragraph of Section 3.2: "This initial period will be useful in assessing cover performance in a recovery period after undergoing extreme drought conditions or the occurrence of a range fire when little or no vegetation is present. The duration of the initial sampling frequency may be extended based on the maturity of the vegetation cover so that more representative data can be collected."

16. **Operation and Maintenance Plan, Page C-5, Section 3.3, paragraph 1:** Rather than selecting random sampling points within the established survey grid, a more thorough survey should be conducted with a measurement at each grid point. See Comment #6.

NRF Response

The text has been modified so that the survey will be conducted with a measurement at each grid point to provide a more thorough survey.

17. **Operation and Maintenance Plan, Page C-5, Section 3.3:** It is not clear why soil sampling would be required on an annual basis if a thorough gamma scan does not indicate contaminant migration. Cesium-137 is present at all of the capped sites and could be used as an indicator of contaminant migration. If gamma readings indicate that contamination has migrated, a more systematic rather than random sampling of soil and vegetation could be performed and used to direct response actions. Also, the SOPs and sampling and analysis procedures for the environmental sampling should be attached to the O&M Plan or referenced and summarized with some detail in this section of the O&M Plan.

NRF Response

As identified in the response to EPA comment 16, a more thorough survey is planned by surveying each grid point. However, from experience, current gamma scan instruments are not sensitive enough to pick up low levels of radioactivity. Therefore, random sampling of soil and vegetation is planned on an annual basis, and the frequency of the sampling and surveying may be adjusted after the first five year review or if there are any

significant signs of erosion or animal intrusion. Table C-2 has been added to the text and provides a summation of the SOPs to be used during sample collection.

18. **Operation and Maintenance Plan, Page C-6, Table C-2:** Cesium-137 analysis information should be added to this table.

NRF Response

This comment has been incorporated (it is now part of Table C-3).

19. **Operation and Maintenance Plan, Page C-6, Section 3.4, paragraph 1:** More detail should be provided in this section to describe the neutron access probe data collection including the depth intervals at which neutron access probe readings will be taken.

NRF Response

The text in Section 3.4 was modified as follows: “Soil moisture monitoring data will be acquired through the entire length of the access tube (the depth interval that includes the bottom of the cover to the surface) using a neutron probe (similar to equipment that is typically used by the agricultural and oil industry) that will be lowered into access tubes located within the cover area. The location of the access tubes within the cover areas are depicted in Figure C-2. A log of neutron scattering measurements within the cover profile will be recorded. From the data collected, an estimate of soil moisture content within the soil profile (soil moisture content versus depth) will be generated, to monitor percolation of water from precipitation through the engineered covers. The data will allow comparison of monitored actual infiltration to predicted infiltration developed during the design phase. The data can also be used to help determine whether a breakthrough condition (moisture reaching the bottom of the cover) exits or is about to occur by observing the depth of the wetting front on the soil moisture profile generated.”

20. **Operation and Maintenance Plan, Page C-8, Section 4.0, paragraph 3:** The NRF sampling procedures included in the Facility-wide Groundwater Monitoring Program should be attached to the O&M Plan or referenced and summarized in some detail in this section of the O&M Plan.

NRF Response

The text was modified to state “USGS standard operating procedures” which are documented in an internal USGS document.

21. **Operations and Maintenance Plan, Page C-8, Section 4.1, paragraph 2:** The constituents included for groundwater monitoring are the same as those listed as initial contaminants of concern in the ROD with the exception of tritium. If the initial contaminants of concern are the primary basis for selecting constituents for the monitoring program, this should be succinctly stated. Also, this section lists “other constituents” monitored under the overall NRF Groundwater Monitoring Program. If any of these other constituents are considered necessary as components of the monitoring program for the three new engineered cover areas, this should be clarified. Otherwise, one or more of these constituents might be considered for removal from the general groundwater monitoring program in the future and there would be no basis to determine if these are considered necessary for monitoring NRF-14/12B, NRF-19, and NRF-21A.

NRF Response

Tritium is a groundwater contaminant that is known to emanate from the S1W Leaching Beds. In the past, NRF has been able to identify and track a plume that originates beneath the leaching beds and spreads downgradient a short distance. The concentration of tritium in the downgradient wells has been well below Federal drinking water guidelines; however, because tritium is a good tracer/indicator, it is valuable in predicting groundwater movement and forecasting the possible presence of other radionuclides. For these reasons NRF will continue to collect tritium data. Section 4.1 was changed to read as follows.

"The identification of analytes to be monitored focuses on those that have been identified as primary constituents of concern in the 8-08 ROD. Tritium was included as it is a groundwater contaminant that is known to emanate from the S1W Leaching Beds. In the past, NRF has been able to identify and track a plume that originates beneath the leaching beds and spreads downgradient a short distance. The concentration of tritium in the downgradient wells has been well below Federal drinking water guidelines; however, because tritium is a good tracer/indicator, it is valuable in predicting groundwater movement and forecasting the possible presence of other radionuclides. Based on this information, only selected radionuclides, including tritium, and lead were included in Table C-5 for the 8-08 Groundwater Monitoring Plan. Other constituents (i.e., organic and inorganic constituents) are currently being monitored under the overall NRF Groundwater Monitoring Program, as described in Section 4.2."

22. **Operation and Maintenance Plan, Page C-9, Table C-3:** Plutonium-244 should be added to the table.

NRF Response

Comment has been incorporated (it is now part of Table C-5).

23. **Operations and Maintenance Plan, Page C-9, Section 4.1.1:** If any of the "general indicator parameters" other than gross alpha and gross beta area considered necessary for monitoring the three new engineered cover areas, this should be clarified. See Comment #10.

NRF Response

See NRF response to IDEQ comment 29.

24. **Operation and Maintenance Plan, Page C-10, Section 4.2, first partial paragraph:** This section should be revised to explain that the sampling schedule could be "augmented" to support studies to determine causes of fluctuations. The term "altered" implies that the timing of sampling could be switched or the list of constituents reduced from the current program without Agency consensus.

NRF Response

Comment has been incorporated by replacing the word altered with augmented.

25. **Operation and Maintenance Plan, Page C-10, Section 4.3, first paragraph:** The "standard local environmental sampling procedures" should be described in this section.

NRF Response

Sample collection procedures to be used for collecting groundwater samples are USGS standard operating procedures. A footnote has been added to Table C-6 to reflect the use of USGS procedures.

26. **Operation and Maintenance Plan, Page C-10, Section 4.3, paragraph 2:** This section should explain why nickel-63 and specific alpha emitting radionuclides might eventually be removed from the sampling program and when this change might be considered (i.e. at the five-year review).

NRF Response

This section has been modified to remove analyzing for specific alpha emitting radionuclides since strontium-90 and cesium-137 are more prevalent indicator constituents. The analysis for alpha emitting radionuclides will be performed if these indicator constituents are detected. For nickel-63, if there are no significant trends or the concentrations are reported as non-detects over the five-year review period, then consideration to remove nickel-63 from the sampling program will be given during the five-year review. This has been clarified in the text.

27. **Operation and Maintenance Plan, Page C-12, Table C-4:** Information for lead should be added to this table and Cesium-137 identified as the gamma analyte.

NRF Response

The Table has been updated to specifically list cesium-137 and lead (it is now part of Table C-7).

28. **Operation and Maintenance Plan, Page C-12, Section 5.0:** The information that will be reported to the agencies should be specifically listed in this section (i.e. groundwater sampling results, neutron access probe readings, radiation survey results, and cap and equipment inspection forms). The month and year that the data will be collected or inspections will occur should be listed. The month and year that the information will be transmitted to the agencies should be listed and the vehicle for submitting this information should be identified. If the NRF Annual Environmental Monitoring Report will be used to document this information, this report should be submitted to EPA and IDEQ.

NRF Response

NRF will submit groundwater, soil, and vegetation sample results, neutron access probe readings, radiation survey results, and inspection forms (cover, wells, and equipment) to the agencies. The FFA/CO identifies that sample data will be submitted to the agencies within 120 days of collection. The ICP states the Institutional Controls Monitoring Report and inspection forms will be forwarded prior to the end of the calendar year. The remainder of the surveys and readings will be submitted with the Five-Year Review. The text has been modified to clarify these points.

29. **Operation and Maintenance Plan, Attachment 1:** The description of inspection requirements listed in the Site Inspection Sheets should be moved into the body of the Operation and Maintenance Plan. The Site Inspection Sheets could then be set up in a table format with a brief heading for each requirement. This format would be more practical for field use and for concise presentation in a report. These inspection items should also be accompanied by a photo log. See attached form from the OU 4-13 Operation and Maintenance Plan for an example of possible format.

NRF Response

Sections 2.1, 2.2, 2.3, and 2.4 were modified to include a description of the inspection requirements. The old inspection form was modified and split into two forms (Attachments 1 and 2) that resemble the OU 4-13 O&M forms.

30. **Institutional Control Plan, Page D-3, Section 2.3.1:** The five-year review report concluded that the landfill covers remain protective of human health and the environment, but there were deficiencies with the cover condition including problems with adequate vegetation.

NRF Response

The noted deficiencies were considered important and deserved comment in the Five-Year Review document; however, they were not deemed serious enough to diminish the protective nature of the covers. The text has been modified to identify the minor deficiencies as follows: "They were concluded to be in satisfactory condition and remain protective of human health and the environment (although some minor deficiencies existed such as the sparse vegetation coverage at NRF-1)."

31. **Institutional Control Plan, Page D-6, Section 2.3.2:** It states here that, in most cases, No Further Action sites may be reclassified as No Action sites as a result of radioactive decay. The sites that will decay to below risk levels after 100 years should be listed here and information to support this conclusion (i.e. maximum concentrations and radionuclide decay rate) should be provided. Those sites that may require a longer period of institutional controls should also be identified and the expected duration of these controls should be included.

NRF Response

Of the 13 sites referenced in this section, 10 sites contain cesium-137 below CERCLA clean up levels established in the ROD. The CERCLA cleanup level for cesium-137 (16.7 pCi/gm) was based on 100 years of institutional controls at which time radioactive decay would reduce the risk to unrestricted levels and a site could be reclassified as "No Action." Two of the sites (NRF-18A and NRF-22) contain non-radiological constituents and may require institutional controls indefinitely (i.e., until they become accessible for further evaluation when the structures over these sites are removed and additional corrective actions are possible). The last site contains elevated levels of cesium-137 that will not decay to below risk-based levels within 100 years. However, this site is located beneath ECF and its final disposition will be determined when the ECF building is removed. The text has been change to clarify these points.

32. **Institutional Control Plan, Page D-12, Table D-1:** The requirement for signs and fencing varies between sites, but it is not clear why there is this difference. This should be explained either in the "Objective" column or in the previous section in which each site is described.

NRF Response

Table D-1 refers to tools (institutional controls) used to prevent unauthorized excavation and/or access (engineered cover areas). Some of the controls are not necessarily required to prevent unauthorized excavation, e.g., fencing at the "No Further Action" sites; however, they are controls presently in place that will be maintained. The following sentences were added to Section 3.0 to clarify these points: "Not all ICs identified in

Table D-1 are required components for each site, but are identified in Table D-1 to emphasize the tools currently in place to prevent unauthorized excavation. For example, some of the “No Further Action” sites are currently fenced and, although fencing is not a necessary component to prevent unauthorized excavation, it is a component currently in place that will be maintained.” In addition, more detail was put into the tools column of the table. The table was also expanded to show that all areas will be posted with signs, which is a needed tool to prevent unauthorized excavation.

33. **Institutional Control Plan, Page D-16, Section 3.4, last sentence:** The INEEL Public Information Group is listed as the entity responsible for providing stakeholder notification. How is this group related to the INEEL Public Information Office and INEEL Community Relations listed in Section 4.2.3?

NRF Response

The correct phrase is the INEEL Community Relations Plan Group. The text was changed accordingly throughout the ICP.

34. **Institutional Control Plan, Page D-16, Section 4.1:** The information that will be included on the warning signs should be described in this section.

NRF Response

Section 4.1 has been modified to include another paragraph. The paragraph will read as follows: “Warning signs will indicate site name, general hazard (i.e., ‘Radionuclides’, ‘Metals’, etc.), access restrictions (i.e., ‘No Unauthorized Excavation’), and point of contact (e.g., ‘Environmental Affairs’).”

35. **Institutional Control Plan, Page D-17, Section 4.2.3, paragraph 2:** This section makes it clear that the public will be notified of institutional control failure through the INEEL Public Information Office and of property lease and conveyance through INEEL Community Relations. However, it is not clear what information would be provided in the INEEL Information Repository and under what circumstances this would be required. Does this refer to copies of the annual institutional control monitoring reports? Also, it is not clear how stakeholders receive a copy of the five-year review report or a letter providing notice that the five-year review report is available in the INEEL Information Repository.

NRF Response

This paragraph was modified to clarify that copies of the Institutional Control Monitoring Report and Five-Year Reviews will be sent to the INEEL Information Repository. Public notification about the Five-Year Reviews will be handled through the INEEL Community Relations Plan Group following currently accepted INEEL protocol. Presently this includes notification in local papers via an informational advertisement either at the beginning of work on the Five-Year Review or when it is issued. The text was changed to reflect public notification for the Five-Year Review.

36. **Institutional Control Plan, Page D-22, Sections 7.0 and 8.0:** The month during which inspections will occur and the subsequent report will be submitted to EPA and IDEQ should be listed.

NRF Response

Inspections of the landfill covers in the past have been performed during the June and July timeframe. Since these inspections are performed annually, future inspections will likely occur during the late spring or early summer. However, to maintain some flexibility (due to weather concerns or other extenuating circumstances), NRF will allow annual inspections to occur anytime prior to October 31. Results of the inspections will be discussed in an Institutional Control Monitoring Report that will be issued to the regulatory agencies by December 31 of each year. The text was modified to state that inspections will be performed by October 31 each year (target timeframe of June/July), and the report will be issued by the end of the year.

37. **Institutional Control Plan, Attachment 1:** The description of inspection requirements listed in the Institutional Control Field Inspection Checklist should be moved into the body of the Institutional Control Plan. The Field Inspection Checklist could then be set up in a table format with a brief heading for each requirement. This format would be more practical for field use and for concise presentation in a report. These inspection items should also be accompanied by a photo log.

NRF Response

These changes were incorporated as suggested. Section 7.0 includes a description of the inspection requirements. A revised checklist has been included with the ICP.

38. **Construction Quality Assurance Plan, Page I-1, Section 2.1:** Kathy Ivy should also be described as an EPA RPM.

NRF Response

Comment has been incorporated.

Editorial Comments

1. **Operation and Maintenance Plan, Page C-5:** The "Monitoring Frequency" heading should be listed as Section 3.2 rather than Section 3.1.

NRF Response

Comment has been incorporated.

Appendix L

State and EPA Comments

(Phase II Draft Final Remedial Design Report/Remedial Action Work Plan)

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Responses to IDEQ Comments on the Draft Final Phase II RD/RA Work Plan

1) Response to Draft RD/RA-II Work Plan Comment # 3, Section 2.2.4, Page 6, Second Paragraph

IDEQ approved the OU 8-8 Explanation of Significant Differences on July 8, and the USEPA approved it on July 11, 2002. Therefore, the text can now acknowledge that the ESD has been approved, and note that the ESD has been released to the public (presuming that release will occur prior to document finalization).

NRF Response

The text was modified to state that the ESD was approved by the regulators and had been released to the public.

2) Response to Draft RD/RA – II Work Plan Comment # 6 (c), Section 4.1.1, Pages 14-15

The IDEQ appreciates and strongly supports the plan to obtain hydraulic conductivity data to support the cover design. The following comments are focused on making the plan more complete. The anticipated target depth of sampling at each site should be identified in the document text (currently this information is stated in the comment response). The text can also state that the samples may be collected at shallower depths if tight soils are encountered below the waste layers, but above the target depths.

We suggest that an appropriate place to add this would be in Section 4.1.3. Additionally, the text should indicate the test method that will be used to determine hydraulic conductivity.

NRF Response

The text under Section 4.1.3 was modified to identify the anticipated target depth of sampling at each site and the test method to be used to determine hydraulic conductivity. The specified target depth range is directly below the waste zone, so no shallower depths will be available for sampling.

3) Response to Draft RD/RA-II Work Plan Comment # 14, Section 4.1.4.2, Sixth Sentence

IDEQ accepts the response, provided the text in section 4.1.4.2 is modified to state that 95% compaction is the minimum (not the target) value. We will consider the lower compaction if we are provided the results of further testing proving that 90% compaction will provide a minimum permeability of 1×10^{-5} cm/sec (or lower as necessary based on the results of the permeability testing).

NRF Response

The text was revised to state that 95% compaction is the minimum value and that this value may be revised based on hydraulic conductivity testing to be conducted once a borrow source has been identified for the project.

4) **Response to Draft RD/RA-II Work Plan Comment # 15, Section 4.1.4.2, page 21, Second Paragraph**

IDEQ agrees with the NRF response to USEPA comment #4 relative to the ability of a 3% cover slope to sustain adequate vegetative growth. IDEQ further believes that the capillary break action provided by the designed cover will function better with a 3% slope rather than a 2% slope. IDEQ therefore maintains that the cover slope should remain at the original 3% slope value. Further discussion is therefore needed between NRF and the Agencies to resolve this comment.

NRF Response

Based on later discussions between NRF, IDEQ, and the EPA, the text has been modified to specify the original 3% slope as the minimum value.

5) **Response to Draft RD/RA-II Work Plan Comment # 24, Appendix C, Section 3.3, Page C-5, Second Paragraph**

The information presented in Table C-2 is insufficient for us to evaluate the procedures. The descriptions should include enough information to evaluate how the procedure will be implemented. However, it is not necessary, for example, to specify exact equipment model/type.

NRF Response

The table has been modified to include a summary of the procedural steps for each of the procedures listed.

6) **Response to Draft RD/RA-II Work Plan Comment # 32 (b), Appendix C, Section 4.3, Page C-12, Table C-4**

There is no Table C-7. It appears the response is referring to Table C-6.

NRF Response

The response was referring to Table C-6 as noted.

7) **Response to Draft RD/RA-II Work Plan Comment # 40, Appendix I, General Comment**

The response to this comment (and the text in Section 2.3.1) states that the CQA Officer/Inspector shall have a degree in civil engineering and have at least 5 years of field experience in the construction of engineered covers. It further states that these requirements can be met with an alternative degree or experience as approved by Bechtel Bettis. IDEQ disagrees with this last statement. These requirements are minimum qualifications for this critical role.

NRF Response

The text was modified as follows: "...an alternative degree and/or experience as approved by Bechtel Bettis and the Agencies."

8) **Response to Draft RD/RA-II Work Plan Comment # 44, Appendix I, Section 11, Table I-3, Page 1-9**

The comment response states that if either of the two tests performed adjacent to a failed soils test also fails, that the area "should" be repaired. Please change this verbiage to state "shall" be repaired. Further, the text of Section I-12, page I-10 states that replacement of the lift "may be" necessary. Please replace this text with "shall" be necessary.

NRF Response

The text was modified as stated.

Responses to EPA Comments on the Draft Final Phase II RD/RA Work Plan

- 1) **Response to EPA Comment 11:** The clarifying text added to Section 7.0 of the work plan should be included in the IC Plan as well. In addition, the IC Plan should identify those “mechanisms” that are in place in the event that there is no longer a government presence at NRF.

NRF Response

The text from Section 7.0 of the Work Plan was added to the second paragraph of Section 1.0 of the ICP. In addition, the mechanisms were noted as establishing necessary deed restrictions, and developing new mechanisms for public and stake holder notification.

- 2) **Response to EPA Comment 12:** The paragraph describing submission of the technical specifications should explain that this information will be submitted as a modification to the Phase II RD/RA Work Plan primary document according to Paragraphs 8.21 through 8.23 of the FFA/CO.

NRF Response

The text was modified to explain that the technical specifications would be submitted as a modification to the Phase II RD/RA Work Plan primary document in accordance with the FFA/CO.

- 3) **Response to EPA Comments 17, 20, 25:** The NRF and USGS SOPs should be either attached or referenced and summarized with some detail in this work plan. This information should not be limited to a general list of the topics addressed in an SOP as shown in Table C-2. A summary should be provided of how the procedures will apply to specific activities that will be performed as part of this work plan.

NRF Response

The table has been modified to include a summary of the procedural steps for each of the procedures listed. A description of the USGS SOP was added to Table C-2.

- 4) **Response to EPA Comment 19:** Neutron Probe readings are generally described as being obtained at specified depth intervals such as 1-ft intervals. The depth interval for readings should be listed.

NRF Response

The neutron probe data will consist of a continuous reading from the bottom of the cover to the surface. The depth increments for the gridlines displayed on the chart will be 0.2 ft.

- 5) **Response to EPA Comment 28:** The timing of sampling data submission is described as the 120 days following sample collection as required under the FFA/CO. However, the specific months during which sampling will be conducted should be listed in order to ensure comparability of the data collected each year. The timing of submission of surveys and readings is described as coinciding with five-year reviews. The surveys, readings, and landfill inspection forms should be submitted annually to demonstrate compliance with the work plan. Again, the specific months during which monitoring and inspections will be conducted should be listed in order to ensure comparability. Typically, monitoring and inspection results have been submitted by other WAGs in one report along with the annual institutional control monitoring results.

NRF Response

Table C-7, which clarifies sample collection, survey, and inspection periods, and submittal timeframes, was added to Section 5.0 of Appendix C.

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